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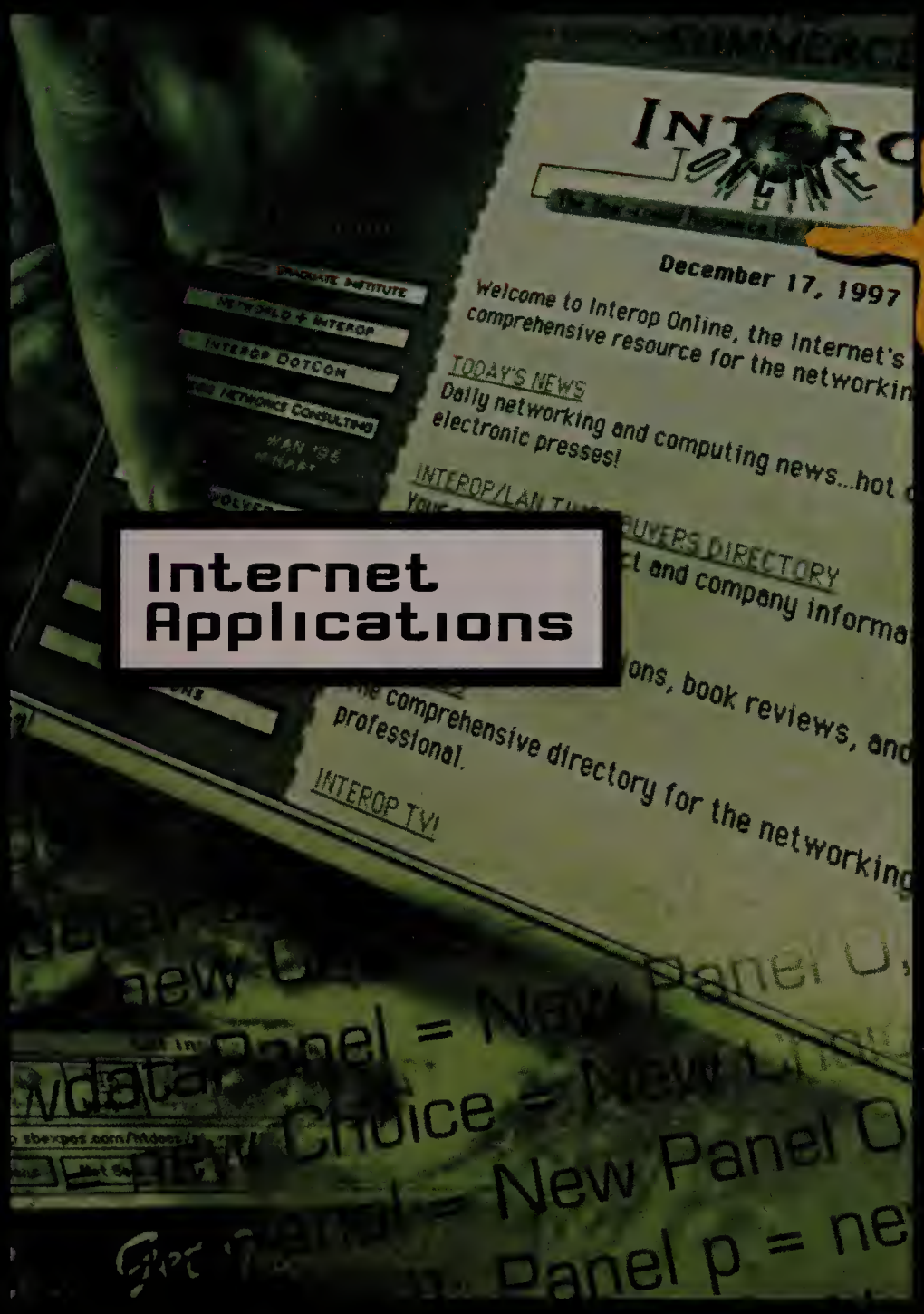

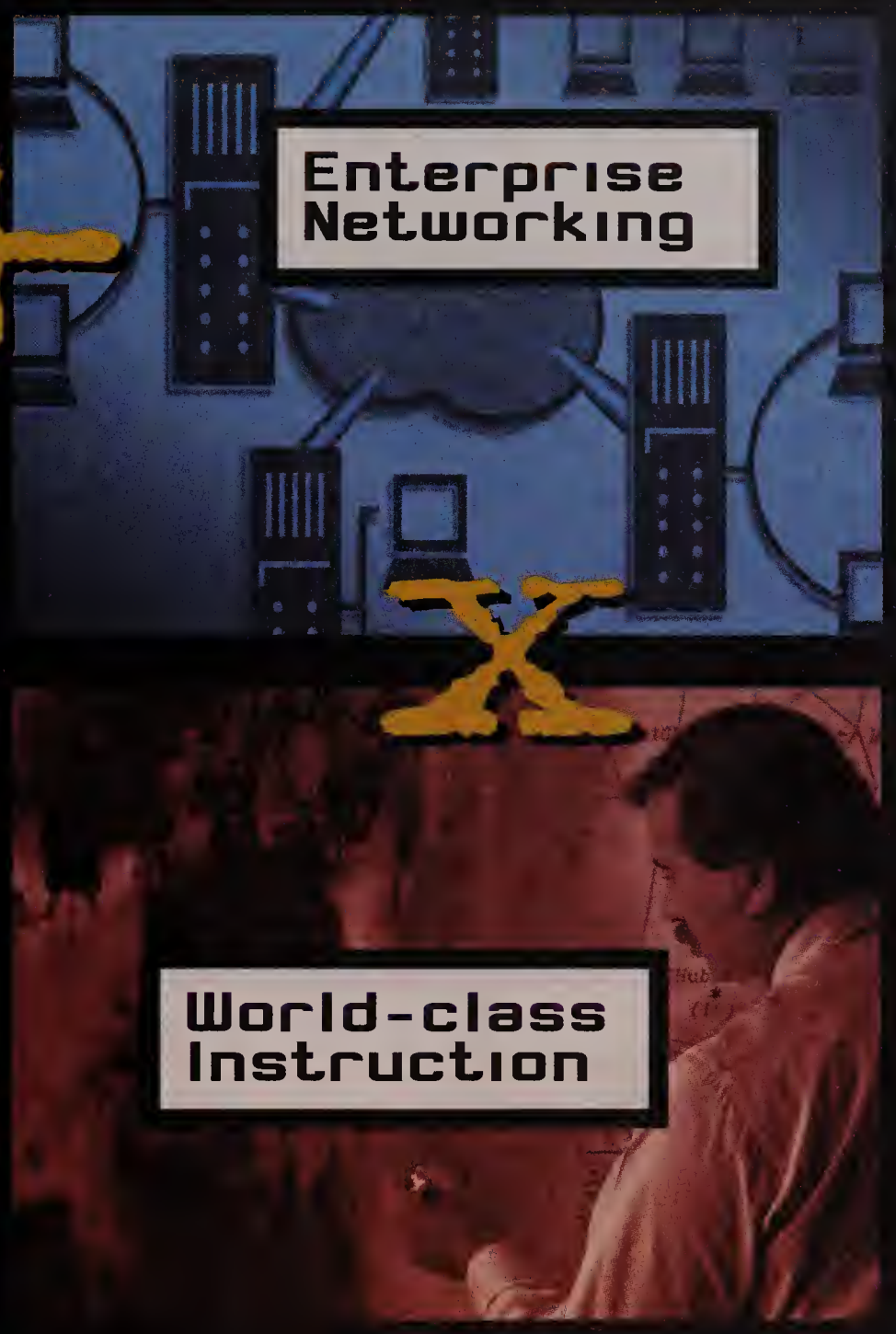

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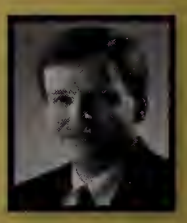

Bruce Sachs
Executive Vice President and General Manager Internet/Telecom and Remote Access Business Units
Bay Networks Inc.

Tom Lyon
Chief Technical Officer and Founder
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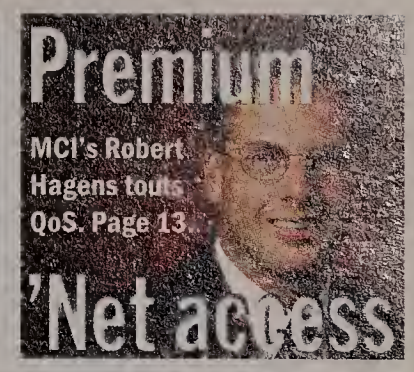
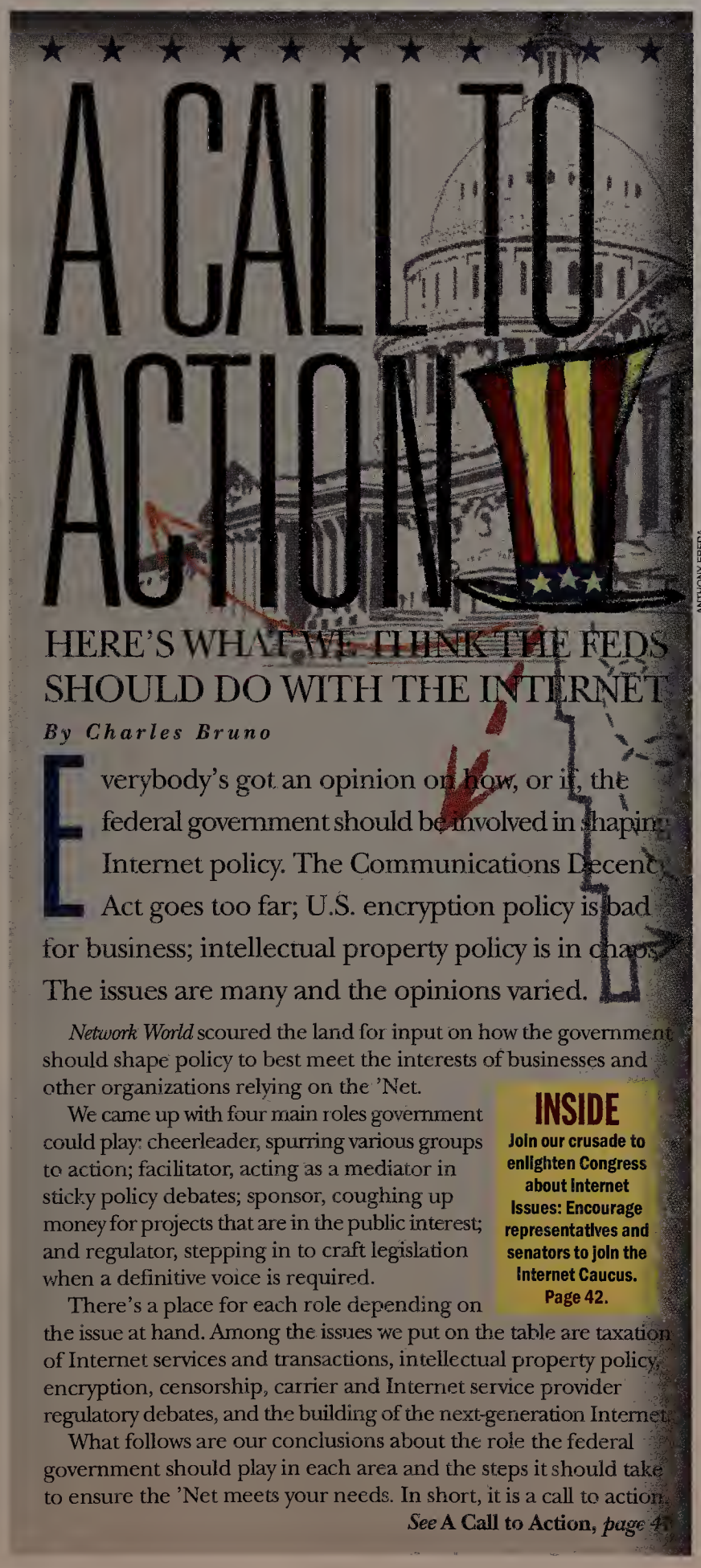
NETWORLD+INTEROP 97

MARCH 31, 1997 VOLUME 14, NUMBER 13

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING





ANTHONY FREDA

By Charles Bruno

Everybody's got an opinion on how, or if, the federal government should be involved in shaping Internet policy. The Communications Decency Act goes too far; U.S. encryption policy is bad for business; intellectual property policy is in chaos. The issues are many and the opinions varied.

Network World scoured the land for input on how the government should shape policy to best meet the interests of businesses and other organizations relying on the 'Net.

INSIDE
Join our crusade to enlighten Congress about Internet issues: Encourage representatives and senators to join the Internet Caucus. Page 42.

We came up with four main roles government could play: cheerleader, spurring various groups to action; facilitator, acting as a mediator in sticky policy debates; sponsor, coughing up money for projects that are in the public interest; and regulator, stepping in to craft legislation when a definitive voice is required.

There's a place for each role depending on the issue at hand. Among the issues we put on the table are taxation of Internet services and transactions, intellectual property policy, encryption, censorship, carrier and Internet service provider regulatory debates, and the building of the next-generation Internet.

What follows are our conclusions about the role the federal government should play in each area and the steps it should take to ensure the 'Net meets your needs. In short, it is a call to action.

See **A Call to Action,** *page 47*

Novell: We're back!

Company uses BrainShare '97 to show off new CEO and tout upcoming products.

By Christine Burns and Paul McNamara
Salt Lake City

Novell, Inc. is not only alive and kicking, but the company assured wary customers at last week's BrainShare '97 conference here that it is ready to reclaim the confidence of those who have all but written it off.

New Novell
CEO Schmidt wants to unlock technology in the labs.

"We have a new attitude, new blood, and the company is going to new places," Novell President Joe Marengi told more than 5,000 attendees before handing the microphone to new CEO Eric Schmidt.

Schmidt, in his first address to the Novell faithful since agreeing to take the top job two weeks ago, said his goal is to unleash technology sitting in Novell labs that will give customers a new class of network services and help fend off competitors such as Microsoft Corp.

BRAINSHARE STORM
- Novell bonds with Oracle
- A peek at Wolf Mountain server cluster technology
- Application Launcher, ManageWise extended
- Our reporter's notebook uncovers the show's offbeat activities

See stories, pages 14 and 15.

Among the technology highlighted at the conference was Border Services, software that provides customers of IntranetWare and other network operating systems with secure Internet access (*NW*, Jan. 20, page 10). Border Services are proxy, firewall, gateway and virtual private net capabilities that tap into Novell Directory Services (NDS) to let companies define network access policies. In addition, Novell revealed plans to add more security features to NDS, such as support for an Internet remote access authen-

See **BrainShare,** *page 14*

ATM's video edge disputed

By Jodi Cohen
Santa Clara, Calif.

If you want to run high-quality video over your LAN, you'll need ATM to the desktop, right? Wrong, says First Virtual Corp.

Ethernet is becoming increasingly robust, thanks to new protocols such as Rapid Transport Protocol (RTP) and Resource Reservation Protocol (RSVP). It is now possible to support multimedia over Ethernet of similar quality to ATM, the company claimed.

With that in mind, First Virtual this week will unveil software and hardware that provide the quality-of-service (QoS) capabilities necessary for videoconferencing, broadcast TV and video

See **FVC,** *page 57*

The great T-3 shortage

By David Rohde

If you think the Internet is backed up, wait until you go out and try to buy a T-3 circuit.

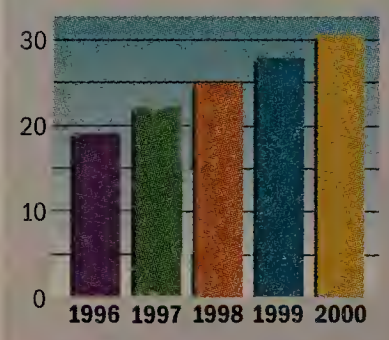
You're likely to find that high-speed pipes suddenly are hard to come by, installation intervals are lengthening, and prices continue to increase.

Why the crunch? Internet service providers and long-distance carriers trying to handle growing traffic volumes nationwide are now after the same 45M bit/sec and higher dedicated circuits

See **T-3,** *page 57*

HUFFING AND PUFFING TO KEEP UP WITH DEMAND

U.S. T-3 private-line market
(In thousands of units)



SOURCE: INSIGHT RESEARCH, LIVINGSTON, N.J.

Cisco fights router bottlenecks

By Jim Duffy
San Jose, Calif.

Trying to stave off the growing perception that routers are a network bottleneck, Cisco Systems, Inc. is boosting bandwidth on its current mid-range offerings and wrapping up development of next-generation backbone boxes.

Cisco this week will announce a high-speed WAN interface for its 4500 and 4700 access routers that features six times the performance of previous modules.

See **Cisco,** *page 57*

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There's one thing you can count on in the future. Your workgroups will demand more. More performance. More reliability. More expandability. Oh yes, and make it affordable. Which brings us to the Compaq ProLiant 800. It's a server with breakthrough price:performance that lets you keep pace and respond quickly. Without overhauling your network. It may be used as only a file and print server now, but you can add a few small applications and groupware ones later. In short, its performance grows as your demands do. Next-generation technology (like Pentium® Pro Processors and Wide Ultra SCSI), a flexible platform, and scalability for future growth make certain of it.

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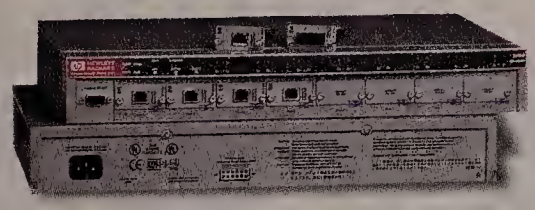
IT'S A ZOO OUT THERE

Hitachi Computer Products' ZooWorks Research for Teams 1.0 promotes workgroup unity. Page 32.

HP LAYERS IT ON

The AdvanceStack Switch line gains Layer 3 capabilities. Page 8.



MAKING THE GRADIENT

David Fowler says NetCrusader makes single logon safe. Page 35.

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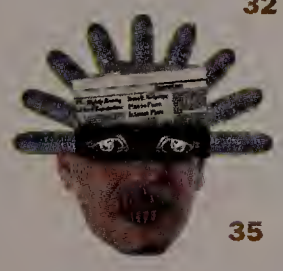

'Net Buzz uncovers a load of Internet-related conspiracy theories. Page 58.

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IP address management raises some sticky issues. **Page 20.**

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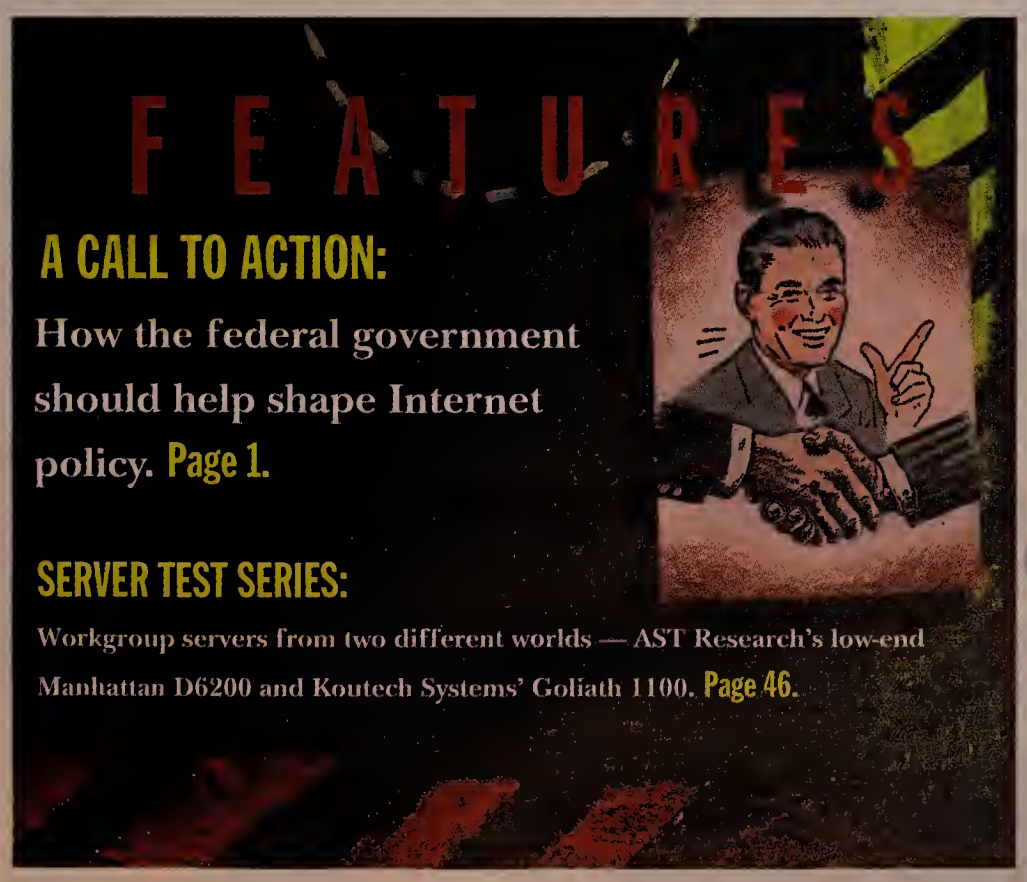

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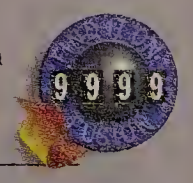

This Week

Only on Fusion

- **Operating systems.** A study by International Data Corp. says new users are increasingly choosing NT over NetWare. **DocFinder: 1343**
- **Remote 'Net access.** A group of vendors last week announced plans for a standard that would let users with smart cards and network computers access data on their desktop or server machines from anywhere in the world. **DocFinder: 1344**
- **Censorship.** ISPs in Austria shut down last week to protest a government raid on one provider involved in a child pomography case. **DocFinder: 1345**
- **The Industry.** Details on Larry Ellison's proposal to buy Apple. **DocFinder: 1348**

From the front page

- **Novell.** Get a complete package of articles and hyperlinks that highlight and explain announcements and events from last week's BrainShare conference. **DocFinder: 1346**
- **Multimedia.** Read our front-page story on First Virtual's proposal for QoS over Ethernet, then come online for overviews of enabling protocols such as RSVP and RTP and an introduction to isochronous Ethemet, another proposal for Ethernet-based multimedia. **DocFinder: 1347**
- **Government.** Get fired up to ask your representative and senators to get more involved in 'Net issues. We'll provide links to find who your reps are and a sample letter to send them. **DocFinder: 1326**

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News briefs, March 31, 1997

Another whopper from Ellison

Larry Ellison, chairman and CEO of Oracle Corp., is organizing an investor group that may launch a $1 billion bid to take over troubled Apple Computer, Inc., according to a published report. If such a bid were successful, Apple Chairman and CEO Gil Amelio, as well as other top managers, would be replaced, Ellison said in an interview published last week in the *San Jose Mercury News*. Mindful of the reaction that his comments might have, Ellison said the bid is dependent on reaction from the market and Apple's major investors.

Ellison

Go configure

Intel Corp. last week launched LANDesk Configuration Manager, hardware and software designed to help companies reduce the time it takes to migrate PCs to Windows 95 and NT. The management server product lets net managers remotely install operating systems and applications on PCs over corporate LANs, eliminating the need to install software at each workstation. LANDesk Configuration Manager is priced at $9,995, and the Service Agent is priced at $250. Both are available now.

Xerox readies networked office plan

Xerox Corp. is set to announce on April 15 a series of networked hardware and software products that will form the new core of the company's $8 billion office document business, according to company representatives. The product launch will be the most sweeping strategic announcement from the company in years, and Xerox hopes it will change the way the company's office products are viewed by businesses. The products will enhance the way document reproduction, archiving and other office automation products are linked to and managed within networked computing environments.

U.S. Postal Service gives MCI stamp of approval

The U.S. Postal Service last week said it has picked MCI Communications Corp. as its managed network service provider, signing a long-term contract that could stretch to 11 years and be worth up to $3 billion. Under the agreement — MCI's largest single contract to date — the carrier will set up and manage a telecommunications network to link 34,000 sites. The U.S. Postal Service has been managing its network in-house through its facilities in Raleigh, N.C., according to a spokesperson for the organization. MCI will work with Cisco Systems, Inc. and others to fulfill the contract.

Cabletron broadening Spectrum

Cabletron Systems, Inc. this week will disclose a Web management strategy that is expected to include Java- and Common Object Request Broker Architecture (CORBA)-based enhancements to its Spectrum management platform (*NW*, Dec. 9, 1996, page 1). In addition to Web browser-based events and reports, Spectrum is expected to include Java-based scripting, which will let users write script files that launch Java applets to remedy faults.

Netscape launches development tool

Netscape Communications Corp. this week will announce a visual development tool for creating client- and server-side JavaScript. The tool will let developers leverage or connect JavaBeans, JavaScript components, HTML components or applications designed for CORBA, sources familiar with the product said. Speculation has it that Netscape and Marimba, Inc. are working on a set of Java classes for defining and moving around push content, another source said. That proposal is intended to respond to Microsoft Corp.'s recently announced Channel Definition Format for delivering push content to users' desktops, the source said.

Network computers

NC boosters bone up on smart cards

By John Cox
Redwood Shores, Calif.

In the latest move to advance the cause of Java-based network computers (NC), Oracle subsidiary Network Computing, Inc. (NCI) and its partners last week proposed the OpenCard Framework, a standard way for so-called smart cards to access NC devices.

Smart cards are credit card-sized devices equipped with semiconductors to store personal information about the cardholder.

When the specification is implemented, users will be able to insert a card into a card reader attached to an NC. Then the user types in an identity code, and with that information, the NC authenticates and connects the user to the appropriate servers. Once the server matches the card information with its user profiles, it downloads the authorized applications, files and establishes data access authorization.

The new OpenCard Framework stresses security and ease of use. "The cryptographic smartcard lets a user's Internet identity be stored securely on the card so it cannot be stolen," said Eric Greenberg, an executive with Netscape Communications Corp. "Users will be able to have a smart card from any vendor, walk up to any NC and access their authorized data and applications," said Ed Harbour, IBM's program director for NC products.

Microsoft has launched an initiative to create a smart card standard for PCs, but NC advocates said users will not be contending with conflicting standards.

The Framework is intended as a high-level interface that smart card vendors can use to access NCs based on NCI's NC Reference Profile. The Framework resides in software on the NC and will work with smart card device drivers incorporated in various applications.

NCI officials also revealed the NC Reference Profile will be formally submitted to The Open Group, a consortium of computer vendors and users cooperating in promoting various computing standards.

The profile currently is controlled by NCI and a handful of partners, among them IBM, Netscape and Sun Microsystems, Inc.

Microsoft Corp. has launched an initiative to create a smart card standard for PCs, but NC advocates said users will not be contending with conflicting standards.

"They are not incompatible: Microsoft is focused on PCs, not NCs," said Donna Van Fleet, vice president of software strategy at IBM's NC division.

Separately, NCI announced a version of the Reference Profile for Digital Equipment Corp.'s StrongARM microprocessor, which is being adopted by a range of NC manufacturers for its low price, performance and minimal power consumption. The specification for the Digital processor guides the manufacturers in building NC devices that incorporate it.

© NCI: (415) 631-4600.

Customer survey shows potential popularity for network computers

By John Cox
Delran, N.J.

A new study exploring how end users actually work with their PCs suggests that about two-thirds of users might readily swap out their desktop machines for Java-based network computers (NC).

The Datapro Information Services Group study of nearly 2,200 users found that most of them work infrequently and for fairly short periods of time with such classic PC applications as word processors and spreadsheets. By contrast, according to the study, users spend much more time accessing corporate databases, E-mail, Web information and mainframe applications. All these are functions for which NCs are said to be ideal, said John MacGilvary, a chief analyst with Datapro here.

In January and February, Datapro telephoned a random sampling of computer users to find out how they used computers and what users liked and disliked about computers. Overall, about two-thirds of the sample said they would consider using an NC, if it met certain needs (see graphic).

The users said today's PCs are important to them because PCs let them store files locally (88%); they can customize their work environment (77%); a floppy disk drive is convenient for transferring information (72%); and it lets them work if the network crashes (59%).

MacGilvary acknowledged that not all these requirements can be satisfied today by Java NCs, which are just coming to market.

To do so will require, for example, more reliable networks so users can be sure of accessing remote files whenever they need to, thus eliminating the need for large-scale local file storage.

Datapro defined the NC as a computer lacking a hard drive, floppy disk drive or CD-ROM drive that does not rely on an underlying processor or operating system.

© Datapro: (800) 328-2776.

Why trade in your Wintel PC for a Java NC?

Respondents cited the following reasons for choosing a network computer over a PC (multiple responses were allowed):

I can still access current applications	62%
It accesses my files anytime, anywhere	62%
I can carry it with me	61%
It reduces software compatibility problems	61%
It doesn't crash all the time	60%
It has enough power to run my programs	60%
It needs less support	56%
I am not interested in NCs at all	25%

Based on 2,195 random telephone interviews conducted by Datapro Information Services Group.

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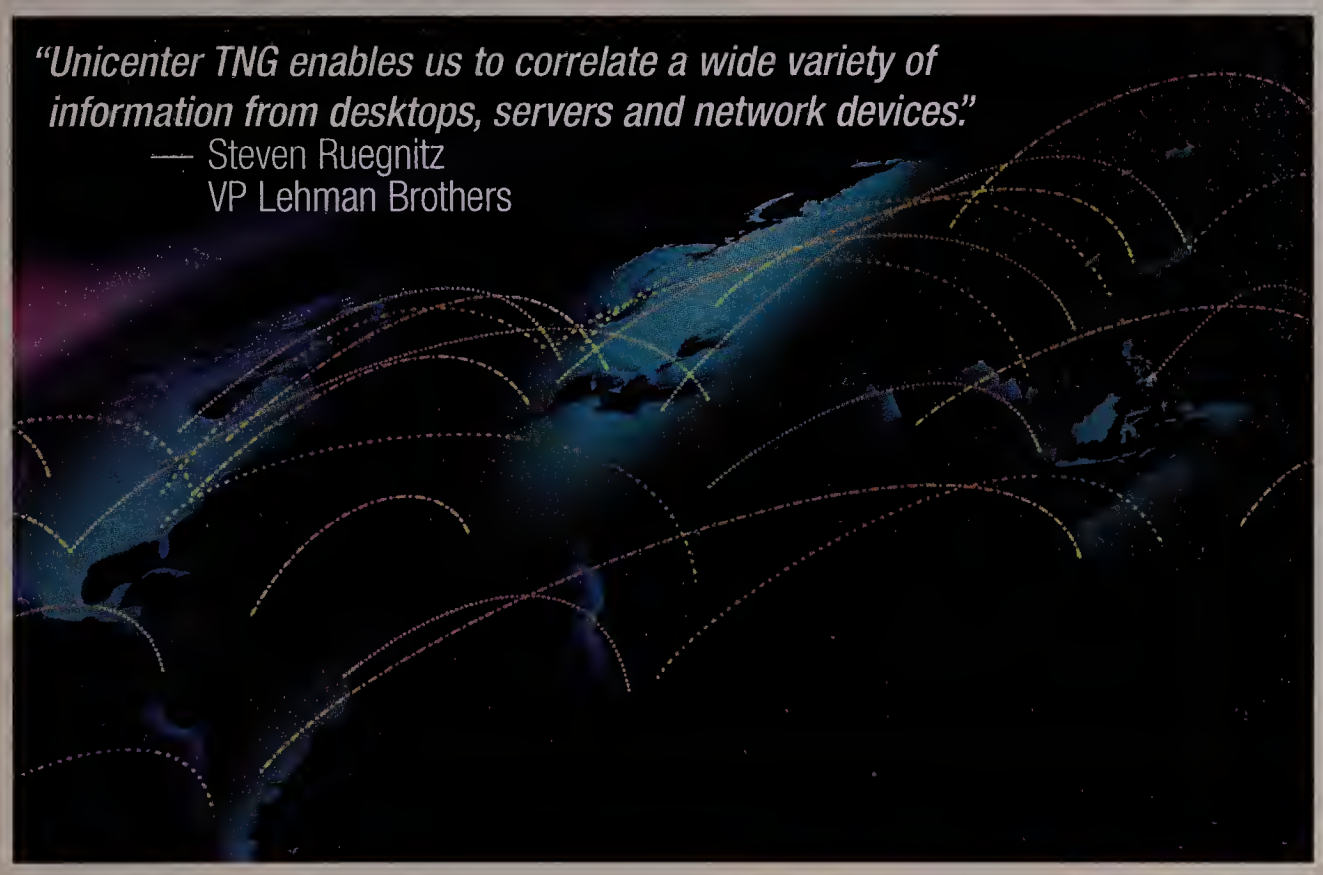

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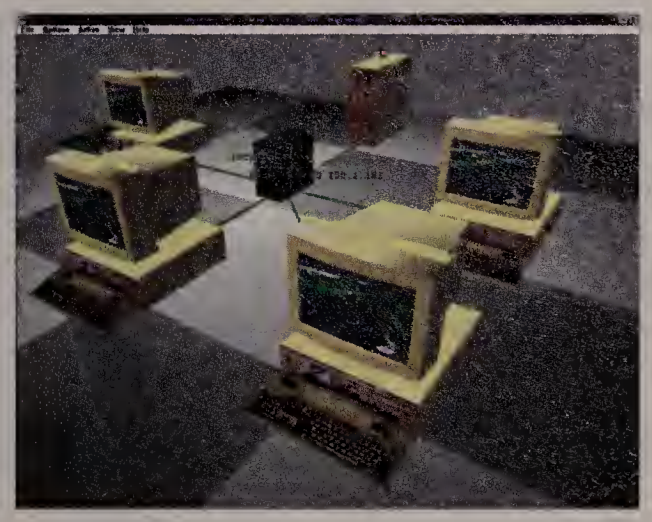

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ISPs to PacBell: A penny a minute adds up to real money

By David Rohde and Tim Greene
Washington, D.C.

The phone company with the nation's highest average online usage last week proposed that Internet service providers pay it a fee of 1 cent for each minute of Internet usage that passes through its switches.

Pacific Bell told the Federal Communications Commission that it needs the fee to compensate for expenses the company incurred in upgrading central offices for Internet traffic — and to promote incentives for new methods of Internet access.

The proposal marks a formal acknowledgment of what has been whispered by regional Bell operating company executives: They have no chance of getting the FCC to impose on ISPs the current 3-cent-per-minute average access fee paid by long-distance carriers for terminating phone calls. Under its proposal, Pacific Bell said the average Internet user would be hit for less than $5 a month, assuming the fee was passed to the customer. High-volume corporate and individual users could end up paying much more (see graphic).

ISPs, user groups and analysts were not taking the penny-a-minute bait. Filing at the FCC's deadline last week for comments on ISP regulation, they said the current system, under which ISPs do not pay access fees, should remain in place while the FCC concentrates on breaking up RBOC monopolies.

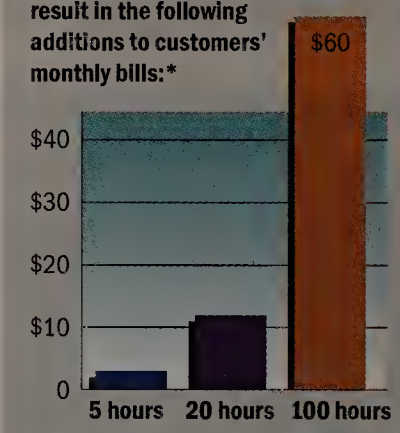
"The RBOCs are saying it's just a matter of finding the right price, and once we do that, everything will be fine," said Colleen Boothby, an attorney here for the Internet Access Coalition. But the RBOCs would simply spend the extra revenue on "more of the same — more voice-grade, circuit-switched plant," Boothby said.

The coalition asked the FCC to speed up moves toward local competition, since "the only thing that will get [the RBOCs] to [install more broadband capacity] is the prospect of losing a customer." The coalition constitutes a Who's Who of the networking industry, including IBM, Novell, Inc., Microsoft Corp., Oracle Corp. and Sun Microsystems, Inc., plus Netscape Communications Corp., most of the large ISPs, and PC makers Dell Computer Corp. and Compaq Computer Corp.

Pacific Bell actually depicted a new ISP access fee as a deregulatory move, claiming that the different treatment of voice and online services constitutes an outdated pricing scheme. "We need to free the 'Net from regulation," said Dave Dorman, president of Pacific Bell.

PENNIES TO DOLLARS

If passed along by ISPs, a 1-cent-per-minute Internet access fee levied by local exchange carriers would result in the following additions to customers' monthly bills:*



*Charges would apply only to dial-up Internet connections.

"For too long, regulatory policies have implicitly steered Internet traffic onto the voice network," he said.

But ISPs pleaded that they need more business lines to meet increasing demands, and that instead of pushing for a fee, carriers should come up with access alternatives that won't clog their switches.

Those services could be priced to encourage ISPs to forgo buying dial-up lines in favor of aggregating dial-up traffic onto a data line, said Mark Knopper, principal with Internet Engineering Group LLC in Ann Arbor, Mich.

Bell Atlantic Corp.'s IP Routing Services does just that. It connects ISPs to their callers via Switched Multimegabit Data Service, Knopper said. And SBC Communications, Inc. offers a dial-diversion service to ISPs that intercepts their calls at the first voice switch and drops it onto a frame relay network. ■

HP unveils service initiative

By Jim Duffy
Palo Alto, Calif.

Hewlett-Packard Co. last week made good on four-year-old promises to turn OpenView into a manager of network service levels.

Under its Service Management initiative, HP is positioning OpenView as a tool to help IT organizations deliver users network services at the levels and costs they promised, making it possible, for example, to track bandwidth and response times.

This direction is consistent with presentations HP delivered at OpenView user conferences as many as four years ago.

The difference now is the strategy is programwide, and HP actually has products to go along with its rhetoric.

"HP had to reorganize and the reorganization makes a lot of sense," said Richard Ptak, analyst at D.H. Brown Associates, Inc. in New Hampshire. "Their efforts had become unfocused over the last year."

Much of the service management strategy will leverage HP's recent union with Microsoft Corp., the upcoming Galaxy release of OpenView, and Web event browsing, reporting and server management capabilities that have been expected since last summer. But some of the strategy is made up of new offerings, including:

- Management through firewalls, which enables organizations to manage systems outside their firewall, such as electronic commerce servers.
- For Your Information events, which enable administrators to inform others of events that impact service levels.
- Application Response Measurement agents for Windows 3.11 and 95 systems, which track transaction response times between clients and servers.
- IT cost-management tools, which allow users to relate the costs of IT services to business objectives (not being released until 1998).

AT YOUR OPENVIEW SERVICE

HP's service-level management plans

- Web server management
- Management through firewalls
- User management support, parallel software distribution and synchronization
- Interactive Web event browser
- Application Response Measurement support for PC desktops
- Event Correlation Services

Many of these service management capabilities will be included in Unix releases of OpenView Network Node Manager, IT/Operations and IT/Administration due in the third quarter.

✆ HP: (800) 752-0900.

HP greets spring with switch splash

By Jodi Cohen
Palo Alto, Calif.

Layer 3 switching is all the rage, and now even workgroup switches are getting into the act.

As expected, Hewlett-Packard Co. last week bolstered its AdvanceStack LAN switch product family with new workgroup switches. These switches support Layer 3 switching, letting a LAN switch handle traffic more efficiently via cut-through routing (*NW*, Mar. 17, page 6).

Initially, Layer 3 switching was reserved for LAN backbone devices that handle lots of broadcast and multicast traffic. But now Layer 3 capabilities are also finding their way into workgroup devices, industry observers said.

HP's Layer 3 switching feature provides IP and IPX broadcast control, which is important to Randy Jackson, network manager at Sun Health Corp., a health care provider based in Sun City, Ariz.

"Because of the automatic broadcast control, I don't have to change all my IP addresses," Jackson said. "This is a tremendous time savings since we have static addresses on more than 1,400 devices. Without Layer 3 switching, we'd have to go out and touch every one of them."

Also, HP added IP Multicast support so that customers can stream video across a switched network without having it flood all ports.

On the hardware side, HP unveiled the AdvanceStack Switch 800T, which offers eight autosensing 10M/100M bit/sec Ethernet ports. The stand-alone device is targeted for wiring closets or server farms.

Also, HP announced a 155M bit/sec ATM uplink module for its AdvanceStack Switch 2000 modular workgroup device. The ATM card came as a result of HP's partnership with ATM vendor FORE Systems, Inc.

HP'S ADVANCESTACK SWITCH 800T

- Supports eight 100Base-T full-duplex ports
- Autosenses between 10M and 100M bit/sec Ethernet
- Boasts a 1G bit/sec backplane
- Provides Layer 3 switching for broadcast control
- Costs $3,999

At the low end, HP rolled out a pair of desktop switches — the AdvanceStack Switch 208T and the 224T.

The Ethernet devices, which do not support Layer 3 switching, provide eight or 24 10Base-T ports, respectively, and two 100Base-T ports.

HP also rolled out a new net management tool. The Network Performance Advisor analyzes traffic patterns and makes network recommendations to the customer in the form of reports. For example, the tool will help net managers decide whether to move nodes across segments or where to add a switch or a 100M bit/sec link to the network.

Pricing for the AdvanceStack Switch 208T is $1,599, the 224T costs $2,899, the 800T is $3,999, and the ATM module for the Switch 2000 costs $8,999. All switches will be available in May except the ATM module, which will ship by year-end.

✆ HP: (800) 533-1333.

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Sybase uncages early version of Jaguar

Internet transaction server software gives Web client real database access.

By John Cox
Emeryville, Calif.

Sybase, Inc. this week will release an early version of Jaguar, software that will let corporate MIS groups build Internet transaction-processing applications.

Jaguar is the latest entrant in a new product category — Internet transaction servers — that let client applications change or update a database, rather than simply read it. That seemingly simple difference is what lets a Web application process a customer order, transfer funds or perform any of the thousands of functions that actually let a company run its business.

In a Jaguar application, Java applets download to a Web browser to set up a high-speed link to the Jaguar server, PCIS's Fung said.

Some smaller outfits are also jumping on the bandwagon. Gemstone Systems, Inc., for instance, this week will set a release date for Gemstone/J, formerly called Cafe Noir. This multiuser application server is optimized for Java and designed, like Jaguar, to deliver transaction services to Internet applications. Fledgling Kiva Software, Inc., meanwhile, this week is announcing a version of its high-performance application server (see story, page 32).

JAGUAR INTERNET TRANSACTION SERVER

Sybase's Jaguar creates a three-tier software framework so Web applications can execute business transactions. Its features include:

- A processing engine that runs on a mid-tier server to boost performance and application scalability.
- High-speed, multiprotocol connectivity links among all tiers.
- The ability to run business logic written as Java servlets, ActiveX controls, CORBA objects, C/C++ code and PowerBuilder applications.

But the biggest news is the ambitious tool from Sybase. "Jaguar lets you develop multitiered client/server applications," said Joseph Fung, director of technologies and tools for PCSI, Inc., an Englewood, N.J., custom software developer and a Jaguar design partner. "To build these, you need a server environment to store and execute the business rules you develop as components. You need some place for transactional support, and you need to funnel multiple client requests to the server [so they can be efficiently distributed to back-end databases]."

Today, very few Web sites handle transactions because of the complexities, Fung said. "If your Web user issues a 'buy' order, and his system crashes before it completes, how do you back out of that transaction safely?" Fung said. "Or if he hits the Stop button on his Web browser, does that stop the HTML page downloading, or does it stop the transaction?"

Jaguar is intended to answer all these questions. In a Jaguar application, Fung said, Java applets download to a Web browser to set up a high-speed link to the Jaguar server. Working with other applets, the user fills in information and sends it to the server, triggering the appropriate business logic, such as an automatic credit check for purchases exceeding a given amount. Jaguar handles access to the databases.

Jaguar has two special features, Fung said. One is that Sybase has ensured no communications software has to be installed on any client. "Jaguar automatically deploys this middleware to the client because it's written in Java," he said. "This is zero-installation and zero-administration computing."

Second, Jaguar will load, store and process application logic written in different component software models: Java server applets, JavaBeans components, ActiveX controls, software objects written for the Common Object Request Broker Architecture (CORBA), C/C++ code, and others.

"You can take existing ActiveX components — application logic, not GUI [graphical user interface] controls — written in Visual Basic 5.0, for example, and put them in Jaguar without having to rewrite them," Fung said.

Jaguar also supports a range of other standards, such as transaction APIs and Open Database Connectivity and JavaDatabase Connectivity for database access to non-Sybase databases, said David Knight, director of Internet transaction processing at Sybase.

Later this year, Sybase will release an update to the Jaguar software developers' kit with an integrated copy of Visigenic Software, Inc.'s CORBA object request broker, which will set up client/server connections among networked CORBA objects.

The developer's offering runs on Sun Solaris and Windows NT.

The final product will be released by September on NT and major Unix platforms. Pricing has not been finalized.

Sybase also is releasing jConnect, a high-performance interface that links Java applications directly to a database, without needing C code or a JDBC bridge. ■

ISP hosts apps tools along with Web sites

By Chris Nerney
Cambridge, Mass.

Developers for Web sites hosted on Internet service provider servers usually expect little more from their ISPs than a reliable connection to cyberspace.

But a new bundling program devised by Web application development start-up VirtuFlex Software Corp. could change all that.

The program makes its debut tomorrow when Global Entrepreneur Network, Inc. (GEN), an ISP based in Tampa, Fla., begins offering its hosted customers access to VirtuFlex 1.1, an applications platform for Web developers.

GEN will be the first ISP to embed a Web applications platform across its system, according to Dan Housman, vice president of marketing and sales for VirtuFlex. The company's tools allow users to build applications to query databases, parse files, and connect to E-mail, the Web, fax modems and pagers.

PROFILE: VIRTUFLEX SOFTWARE CORP.

Location: Cambridge, Mass.
Founded: Oct. 1994, by MIT undergraduates Ronald Schmelzer and Daniel Housman
Employees: 11
Product: VirtuFlex, a Web application development tool
Original product: VirtuMall, an Internet shopping mall
Funding: Private

Lotus Development Corp. in February announced a plan to allow ISPs to rent customized applications to their customers through its Domino server. But service providers have yet to implement the Lotus rental strategy.

"By placing VirtuFlex across an ISP's system, Web developers can gain access to a standard set of tools for all their users," said Housman.

Such programs also could provide an attractive value-added service for ISPs looking for ways to increase revenue and survive an anticipated market shakeout.

"The industry is becoming so competitive that merely providing Web space is no longer sufficient," said Thomas Heimann, CEO of GEN.

Customers who buy a $100 monthly service package from GEN can just log on and have full access to VirtuFlex Web development tools residing on the GEN server. No downloading is required.

GEN, which hosts Web sites for nearly 6,000 businesses around the world, will offer the VirtuFlex 1.1 applications platform to all of its customers as part of a $100 per month services package.

VirtuFlex will get a percentage of the monthly fee.

VirtuFlex 1.1 runs on UNIX servers. The company is developing a version for NT.

✆ VirtuFlex: (617) 497-8006; GEN: (813) 225-3000

National news

Mass suicide at Web design firm

By Todd Wallack
Rancho Santa Fe, Calif.

Several sites designed by a group of 39 people who committed suicide here last week have been jammed with curious users. The two main sites (www.highersource.com and www.heavensgate.com) have been largely unreachable, and at least two media organizations have set up mirror sites to give users access.

According to published reports, the men and women were contract programmers and designed Web sites throughout the San Diego area. Examples of thier clients include the San Diego Polo Club and British Masters, which sells parts for used British cars.

The group apparently believed it was time to leave their "containers" and rendezvous with an unidentified flying object hiding behind Comet Hale-Bopp.

Higher Source's main Web site looks fairly conventional, trumpeting the group's Web design skills, but boasting: "The individuals at the core of our group have worked closely together for over 20 years . . .We try to stay positive in every circumstance and put the good of a project above any personal concerns or artistic egos."

The Heaven's Gate site is more blunt, with detailed descriptions of the group's beliefs.

The main page announced: "Hale-Bopp's approach is the 'marker' we've been waiting for — the time for the arrival of the spacecraft from the Level Above Human to take us home to 'Their World' — in the literal Heavens." ■

The group of 39 men and women *who committed suicide en masse in Southern California last week left clues on their Web sites, including the Heaven's Gate site.*

Users not singing blues over Memphis delay

By Elizabeth Heichler and Sari Kalin

Reports that Microsoft Corp. may ship the successor to its Windows 95 operating system — code-named Memphis — a bit later than expected, might have raised eyebrows on Wall Street but doesn't appear to have disappointed customers.

After press reports of a Memphis delay, Microsoft's stock slumped almost four points last Monday, though it made somewhat of a recovery later in the week.

Microsoft denied that Memphis is late, because the company never actually promised a specific ship date.

Microsoft denied that Memphis is late, because the company never actually promised a specific ship date. Still, a spokesperson confirmed that Microsoft has begun telling OEMs that they are unlikely to receive the final product in time to bundle it with new PCs for the Christmas shopping season.

Customers don't seem too worried.

"A lot of my clients, which include big and small companies, are still using Win 3.11, so I don't see anyone marching for Memphis anytime soon," said Donald Kraft, an independent computer consultant in Skokie, Ill. "For big companies, it's such a major effort to make an operating systems upgrade that I don't think anyone's going to be disappointed that an upgrade is going to be late by six or seven months."

Doug Lidster, electronic publishing coordinator at August Home Publishing Co. in Des Moines, Iowa, said he is more concerned with Microsoft "getting it right" than "getting it out on time."

Analyst Tom Rhinelander of Forrester Research, Inc. in Cambridge, Mass., estimates that 80% of corporate clients have not even upgraded to Windows 95 but are still using Windows 3.1. "The corporate users would actually probably like the Memphis delay because they haven't digested Windows 95 or Windows NT, so the slip isn't a bad thing at all for them," he said.

For some companies evaluating which products to use as they move to more Internet and intranet-based computing, the delay in Memphis will provide some breathing room. For example, Dan Grosz, director of information systems for the Timberland Co. in Hampton, N.H., is looking at products from Microsoft, Netscape Communications Corp., IBM, Lotus Development Corp. and Oracle Corp. in this regard. "It's a little bit of a relief. It gives us a little more time," Grosz said of the apparent slip in the ship date.

Heichler and Kalin are correspondents with the IDG News Service. IDG News Service correspondents Kristi Essick in London, Marc Ferranti in New York, and Jeanette Borzo and Rebecca Sykes in Boston, contributed to this story.

IBM brings server apps package to NT

Communications Server for Windows NT to rival Microsoft BackOffice.

By Michael Cooney
Raleigh, N.C.

IBM has a new weapon in its battle with Microsoft Corp.: Windows NT.

IBM last week delivered Communications Server for Windows NT, a bundle of server software that runs on the Microsoft operating system.

The company already delivers Communications Server packages on six IBM operating system platforms from OS/2 to MVS, providing competition to Microsoft's BackOffice server application suite.

NT gains host hooks

IBM's Communications Server for Windows NT Includes:

- SNA gateway
- tn3270E gateway
- 32-bit APIs
- Advanced Peer-to-Peer Networking High Performance Routing support
- APPN End Node support
- APPN dependent LU Requestor support
- AnyNet SNA over IP and IP over SNA features
- Host-on-Demand Java-based 3270-to-Internet access

The new IBM package includes software for linking SNA and TCP/IP networks, as well as IBM's Host-on-Demand package, which lets SNA users access host applications over the Internet using any industry-standard browser (see graphic).

A host of other vendors will provide additional connectivity tools that work with Communications Server for Windows NT.

For example, Bus-Tech, Inc. will enable its Data Blaster mainframe channel connectivity products to link machines running Communications Server directly to a mainframe.

WRQ, Inc. announced that its Reflection family of terminal emulation products will work with the new IBM package, as well.

And IBM's NT support does not end with Communications Server. The company also has delivered its Transaction Server for Windows NT, which will let Windows NT users more easily interact with mainframe-based transaction-oriented applications such as CICS.

The Transaction Server package includes support for Java and ActiveX and is designed to help users interconnect disparate systems with legacy data.

Communications Server for Windows NT is available for $995 per server and $69 per user.

The Transaction Server for NT is available for $699.

✆ IBM: (800) 426-2255.

Clinton administration has new encryption proposal

Policy targets domestic use, eases government data access.

By Ellen Messmer
Washington, D.C.

For months the Clinton administration has lobbied for its version of key escrow that largely focused on encryption export.

Now in its first formal legislative document, the White House is asking that its policy also apply to data encrypted within U.S. borders and that law enforcement be given access to that data based on a simple request from a law enforcement or government security agency.

The U.S. Attorney General will set up the specific rules for written authorization. Civil liberties groups highly critical of the White House plan pointed out that under the basic guidelines it will be easier for law enforcement to get encryption keys than to tap phones, which requires a warrant or court order.

The administration does not just face domestic opposition to its proposed policy. The international community, represented by the 29-nation Organization for Economic Cooperation and Development (OECD), also has not rallied behind the Clinton cause.

After a year of study and intense lobbying by the U.S. Justice Department, the OECD, based in Brussels, Belgium, last week released the "Cryptography Policy Guidelines," an eight-point document that recognizes nations *may* want to have access to cryptographic keys or unscrambled plaintext. But the OECD guidelines fall far short of recommending key recovery as the preferred international approach.

Some participants in the OECD crypto-policy effort were pleased with its outcome, including Marc Rotenberg, director of the Electronic Privacy Information Center here.

"There's a strong emphasis here on privacy and voluntary market guidelines," Rotenberg said. The OECD guidelines state that users should have a choice in cryptography, that cryptography should be driven by business requirements, and that the privacy of personal data and the secrecy of communications should be respected.

Congressional cold shoulder

So far, no legislators on Capitol Hill have embraced the ideas in the administration-drafted legislation, the Electronic Data Security Act of 1997, which also calls for nationally certified key-recovery centers for storing copies of encryption keys.

STAN BAROUH

RSA Data Security's Bidzos *says, "The intent is to discourage use of strong, unescrowed encryption in the U.S."*

"From our point of view, it's a breathtaking expansion of law enforcement's surveillance authority," said Alan Davidson, staff counsel at the Washington, D.C.-based Center for Democracy and Technology (CDT) about the draft bill. The CDT has posted the bill on its Web site, www.cdt.org.

Commerce Department Under Secretary William Reinsch, whose office took the lead in drafting the bill, last week had no comment.

The draft bill emphasizes that the key-recovery regulation is voluntary in the U.S., but opponents argue otherwise.

The White House draft defines as the federal standard only digital certificates that work with key-recovery encryption products.

And under the drafted bill, employees working in a government-certified key-recovery center would be spared any civil or criminal liabilities for disclosing decrypted information to a government agency.

Through the economic incentives and regulatory impact of the Clinton administration bill, "they plan to severely limit [the products] you can choose from," according to Jim Bidzos, president of RSA Data Security, Inc., whose public-key technology is widely deployed in encryption products. "The intent is to discourage the use of strong, unescrowed encryption in the U.S." ■

Sun whips up new Java flavors

By Ellen Messmer
San Francisco

With so many devices yearning to be Java enabled, one flavor of Java just isn't enough.

So at this week's JavaOne conference here, Sun Microsystems, Inc.'s JavaSoft division will unveil a plan to let developers build products for a wide range of equipment — everything from smart cards to copiers to fax machines.

The key is the way Sun will package its growing number of APIs, providing specific API sets for specific uses.

JavaSoft plans to release a draft specification for SmartCard Java, Embedded Java, Personal Java and Enterprise JavaBeans, which each use the same basic Java Virtual Machine but come bundled with different APIs, a Sun source said.

For example, the Enterprise JavaBeans package would include some heavy-duty APIs, such as Java Database Connectivity and Remote Method Invocation, that would be useful for client/server transaction processing but would likely be unnecessary in a fax machine.

But the Embedded Java package of APIs would be optimized for fax machines or copiers, according to sources at JavaSoft.

The Personal Java package will be suitable for developing Java to run in small handheld devices such as personal digital assistants.

And SmartCard Java will have everything required for workplace authentication, such as digital certificates (see story, page 6).

"One solution doesn't fit all," said Karl Jacob, president of San Francisco-based Dimension X." A phone doesn't have the need for all of the user interface components in AWT [Abstract Windowing Toolkit], and some of the embedded systems don't necessarily need the networking code."

The API packaging plan does not require entirely separate tools, sources said.

According to JavaSoft's plans, the same Java Development Toolkit could be used to write Java programs for any of these Java packages.

In other news

JavaSoft also will introduce the Java Development Kit Win32 Dynamic Link Library for JDK to run on Windows, and will take the wraps off more API initiatives, such as a Java text-to-speech API.

Sun will launch the beta version of its JavaStudio and JavaStudio Professional application development tool kits. JavaStudio, which was code-named ProjectStudio, is a JavaBeans development tool that lets users who lack programming skills build applications using drag-and-drop methods, according to officials.

Carol Sliwa and IDG News Service Correspondent Niall McKay contributed to this report.

J/SQL to give JDBC run for database money

By Ellen Messmer
San Francisco

A trio of large vendors is hoping to do Sun Microsystems, Inc.'s Java Database Connectivity one better.

At the JavaOne conference here this week, IBM, Oracle Corp. and Tandem Computers, Inc. will throw their collective weight behind a Java version of SQL they would like to see widely adopted.

The specification is intended as an alternative to the official Java database standard, Java Database Connectivity (JDBC), that made it into the Java programming lexicon last year. J/SQL is presented as a more efficient way to program in Java and also as a means for promoting portability across database applications.

"J/SQL is an embedded Java interface to SQL that gives you more immediate access to database resources and executes more efficiently," according to Mona Matsumoto, Tandem's product manager for database connectivity.

Tandem is creating a J/SQL precompiler for its database. As a result, users can have binary portability of their programs, Matsumoto said.

That means, for example, that applications developed on Tandem computers can run on IBM DB2 or other databases supporting the other standard.

By contrast, JDBC is a call-level interface that provides a less concise underlying connection to a database, said Steve Levine, Oracle's director of product marketing.

J/SQL is intended as an alternative to the official Java database standard, Java Database Connectivity, that made it into the Java programming lexicon last year.

"J/SQL is a complement to JDBC," said Levine. "In fact, the spec will have a translator for J/SQL to JDBC." For example, a 10-line program written in J/SQL would translate into JDBC plus a 50-line Java program, Levine said.

JDBC is appropriate for dymanic or on-the-fly queries, Levine said, but developers will probably prefer to use J/SQL for mission-critical applications because it's easier to write applications concisely against a database.

"To application developers, it will be a whole lot easier to get database data into Java applications, regardless of the vendor," said Jeff Jones, program manager at IBM's Software Solutions division. IBM is adding support for J/SQL to DB2.

This week the specification goes out for comment. "Our goal for J/SQL is to turn it into an industry standard," Levine said.

IBM, Oracle and Tandem appear intent on adding J/SQL to their programming tools, databases and Web application servers, come what may. ■

Quality of service

MCI promises Internet QoS services

By Denise Pappalardo

MCI Communications Corp. last week revealed its plans to deploy Cisco Systems, Inc.'s latest Internetwork Operating System software with its NetFlow switching capabilities to add two Internet quality-of-service (QoS) levels.

The standard level will be for E-mail-type traffic, said Robert Hagens, director of Internet engineering at MCI, while the priority service level will typically be used for mission-critical or delay-sensitive traffic.

"Initially, the mechanism will be fairly coarse," Hagens said. "But in later releases, more granularity will be available so users can set priorities on video or conferencing applications."

The QoS capabilities will first be deployed in Concert's InternetPlus international service this summer. Concert is a joint venture between BT North America, Inc. and MCI. MCI expects to upgrade the routers in its domestic network by year-end and roll out the service sometime after that.

Users, however, will pay a higher price for this priority service.

MCI's Hagens *explains, "Initially, the mechanism will be fairly coarse. But in later releases, more granularity will be available so users can set priorities on video or conferencing applications."*

Dan Taylor, a senior analyst at the Aberdeen Group, a consultancy in Boston, said QoS is interesting, but latency is a more important issue to address today. Some Internet service providers are offering fixed latency guarantees to users that depend on the Internet for business applications, Taylor said.

Concentric Network Corp. of Cupertino, Calif., for example, guarantees that users will not experience more than 150 milliseconds of latency between any two points in Concentric's network.

If Concentric does not meet the guarantee, users can get out of their contracts without penalty, said Jeff Ronaldi, Concentric product-line manager.

And UUNET Technologies, a subsidiary of WorldCom, Inc., offers a 150-millisecond-or-less latency guarantee on its ExtraLink service, said Alan Taffel, UUNET's vice president of marketing and business development.

But the Fairfax, Va.-based ISP only offers the guarantee on ExtraLink because it does not involve other ISP networks, Taffel said.

UUNET also guarantees its dedicated Internet access customers will be compensated if they are not able to access the network.

"If our network is unavailable to a customer for an hour, then we will refund them for a day's worth of service," Taffel explained.

"If it's unavailable for four hours, we will refund them for a week's worth of service," he said. ■

LCI adds frame relay QoS punch

While MCI Communications Corp. laid out plans for future Internet quality-of-service offerings, a smaller carrier was putting a QoS stamp on its frame relay service.

LCI International, Inc. last week introduced a frame relay money-back guarantee for a principal QoS measure: network transit delay. LCI said it would guarantee that frames up to 1,600 bytes long would travel across the network in less than a quarter of a second. For smaller frames, the latency guarantee is even more robust.

Frames of less than 500 bytes are guaranteed to arrive in less than 95 milliseconds, or just under 1/10 of a second; frames less than 100 bytes will take a maximum of 35 milliseconds.

The size of frame relay packets varies by originating LAN protocol and application. For example, frame relay access devices designed to transmit voice traffic chop packets into relatively small frames on the theory that dropping any single packet will not significantly affect a conversation.

LCI is not the first carrier to provide a latency guarantee. In fact, MCI itself issued such a guarantee last year. But MCI's guarantee only applies to frames of 200 bytes or less.

The problem is that when SNA traffic is encapsulated into frames, the resulting packets typically range from 200 to 1,200 bytes, according to Tom Jenkins, a broadband consultant at TeleChoice, Inc., based in Verona, N.J.

In fact, LCI's offer is aimed at SNA network administrators who need a final assurance before migrating from private lines to frame relay, said Jeff Phillips, an LCI product manager for data services marketing.

Many SNA users dread forcing their employees to conduct terminal sessions where keystroke commands to a host computer result in worse delays than over private lines, Phillips said.

Along with a latency measure, LCI also introduced its first network availability and throughput guarantees. LCI matched MCI and others with a guarantee of 99.9% delivery of frames within a circuit's presubscribed committed information rate and 99% delivery of frames marked discard-eligible. Like those of many other carriers, all of LCI's guarantees exclude the access line provided by a local exchange carrier.

—*David Rohde*

BrainShare

Continued from page 1

tication protocol and the ability to store and manage standard X.509 digital certificates.

Novell also previewed the Moab edition of IntranetWare, outlined its Wolf Mountain server clustering technology plans and announced a pact with Oracle Corp. under which the companies will link their products (see accompanying stories).

BrainShare attendees, many of whom depend on Novell's continued health for their livelihoods, were cautiously optimistic upon hearing company executives lay out plans for righting what has been a listing ship.

"I am one of those doom-and-gloom people who believe that everything is spiraling toward Microsoft," said Joe Gilmore, senior network engineer at SMART Technologies, Inc. in Oklahoma City. "I would like to see Novell come out on top, but I won't be surprised if it goes either way."

On the more positive side, George Dzieciol, principal software engineer at Symantec Corp. in Santa Monica, Calif., said the inherent strengths of IntranetWare should keep Microsoft at bay. "[Novell is] heading in the right direction. You can't bet against the Internet," he said.

Border Services briefing

Drew Major, Novell's chief scientist and vice president of advanced development, says the company is targeting the space that lies between the Internet and the four million NetWare/IntranetWare servers installed in corporate nets today.

Border Services, which runs as a set of NetWare Loadable Modules on a single server, will be managed via NWAdmin utilities. These utilities allow an administrator to set up Internet access using existing NDS information such as end-user security rights and network addresses. The firewall service and IP and IPX circuit gateways can deny individuals or groups of users access to content and Web sites that an administrator has defined as restricted via NDS.

In addition to providing end users on a corporate intranet with quick access to cached Web data, Border Services can do what Major called "reverse proxy acceleration." By setting up multiple Border Services servers in front of a company's Web server, the clustered proxies then cache data frequently tapped from the Web server. This speeds up delivery of the data and cuts down on the hassles of maintaining replicated Web servers.

While competing products exist, Major said Novell will be the first to provide a suite of Internet access controls that is tightly coupled with a directory service. "Tight integration with NDS lets you manage Internet access down to the individual user level. No one else does that," he said.

Then again, maybe there is a reason no one does it, said one user charged with maintaining security for an international bank. "I question the wisdom of putting access to your directory out on the firewall. If [intruders] hack into the directory out there, they can pretty much see every other resource I have," he said.

Early access code for Border Services is available now and the product will ship in late summer.

NDS itself also will be enhanced to support more secure networking, said Michael Simpson, director of marketing for Novell's Internet Infrastructure Division.

Its first new feature will be the ability to handle X.509 certificates. Novell will also introduce graded authentication, letting administrators define a set of security rules that grants varying degrees of network access, depending upon the method the user employs to tap into the network. For example, end users accessing the corporate network via a Web browser over a public link would not be permitted to access all of the network resources available to them if they log on locally using a secure identification card.

Novell last week said it is further enhancing NDS by becoming the first directory vendor to implement support for Remote Authentication Dial-In User Service (RADIUS), a standard Internet protocol for remote access.

The open beta version of RADIUS Services for NDS is available now at www.novell.com/nds. The first customer shipment is scheduled for release this summer and it will be free.

One product that will not be ready this summer, as originally planned, is the next version of IntranetWare, dubbed Moab. The company says it will not be ready to ship final code until early next year.

To pacify customers, Novell demonstrated pieces of Moab and made pre-beta code available at the show. The upgrade will include a choice of IPX or native TCP/IP, memory protection and a scalable file system. ■

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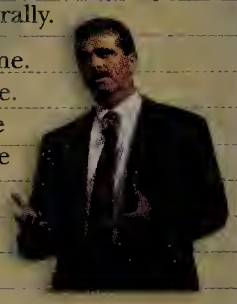
Overheard and over head at BrainShare

Scanning a few EEGs at BrainShare:

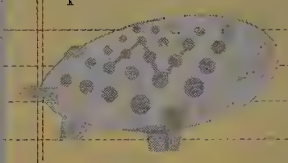
At the **cybercafe,** the java was hot ... the Web servers were not. Attendees looking for a connection to the outside world with their cup of coffee were stymied by balky technology on the conference's opening morning. "Typical Novell," grumbled one would-be browser.

How tough was 1996 for Novell? Maybe not *quite* this tough. "See that guy over there?" offered a wag while pointing out a bus window at one of Salt Lake City's surprisingly numerous street people. "He was at BrainShare last year."

Creature comforts go over big at these shows. Example: 13 **La-Z-Boy recliners** were set out in front of a large-screen TV in the dining hall. All were occupied ... by men, naturally.



Scripted humor at the general sessions was lame. Ad libs from Novell executives were even worse. Take this clunker from company **President Joe Marengi** after he finished congratulating Denice Gibson, senior vice president of Internet products, on her featured presentation: "She may be small, but her handshake is incredibly powerful."



Novell had a **corporate blimp** flying *inside* the convention hall. Sure, it was an unmanned miniature, but the thing still brought out "oohs and aahs."

According to clerks and cabbies, the 5,000-strong BrainShare throng maxed out Salt Lake City's hotel rooms and rental cars. And, by the way, this is the city that will host the **2002 Winter Olympics.**

—Compiled by Paul McNamara

Novell bonds with Oracle and Sun

Novell, Inc. and Oracle Corp. last week outlined a strategic partnership that may boost IntranetWare's reputation as an application server and help make Novell Directory Services (NDS) the tie that binds object-based network applications together.

Under the terms of the multifaceted agreement, Oracle has formed a Novell Products Division, housed in Oracle's Redwood Shores, Calif., corporate headquarters. By year-end, this division will integrate Oracle's Web Application Server 3.0 technology with Novell's Web Server and IntranetWare, said Larry Robinson, director for the new division.

Web Application Server 3.0 will not replace Novell's Web Server, but Robinson said it will provide a platform for developing and deploying applications across Web servers, including those from Microsoft Corp. and Netscape Communications Corp.

Oracle's Novell Products Division will be funded by both companies. Oracle has dedicated 30 engineers to this project, and Novell will supply necessary engineering support. Both companies will market the division's products.

Oracle also has endorsed NDS as the directory service that will allow object-based application components — called cartridges under its Network Computing Architecture (NCA) — to communicate. Oracle introduced NCA last October as its strategy for creating, running and managing object-based network applications.

Separately, Novell became the first company to license Sun Microsystems, Inc.'s Project Studio Java development technology. Project Studio, which will not be announced officially until this week, is a tool that makes it easy to create Java applications by assembling reusable pieces of Java code, called JavaBeans, without requiring any complicated scripting. Down the road, Novell will ship Project Studio with IntranetWare and will build JavaBeans that tap into NDS so users can easily build Java-based, directory-enabled applications.

— Christine Burns

Novell previews management wares

Christine Burns
Salt Lake City

Novell, Inc. last week unveiled plans to introduce software distribution and role-based administration features into its line of PC and net management products.

The company detailed how it will upgrade its Application Launcher, a tool that ships with both ManageWise and 32-bit IntranetWare, to push entire applications out to distributed desktop machines. Currently, Application Launcher lets an administrator install on any desktop computer an icon that contains a Novell Directory Services (NDS) pointer, which can launch the corresponding application from a centralized server.

This upgrade, which will be available in four to six weeks, lets administrators automate the deployment of a common set of applications across machines. Using this tool, an administrator can take a snapshot of all the software running on a model desktop machine, package it and push it down to all other desktops on a network. The upgrade will also include software distribution scheduling.

Novell also demonstrated technology tentatively called the ManageWise Command Center. This Java-based application, which can run on any networked machine that has a Java Virtual Machine, can provide a common console for all ManageWise and IntranetWare-based NWAdmin utilities.

But providing a unified view of the various management utilities is secondary to enabling role-based administration, said Marc Epstein, vice president and general manager of Novell's Management Products Division.

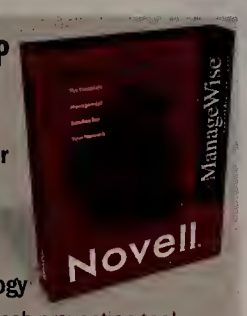
Role-based administration lets a net manager delegate tasks to end users or technicians without giving them full system-administrator rights.

"Take changing passwords, for example, the No. 1 call to help desks. This tool lets you give that technician [on the help desk] a little Java applet to change passwords a hundred times a day," Epstein said. "But because we tie this role-based management to NDS, that technician can't do any other administrative task that violates his preset access rights."

Novell also is working on an API set to allow other vendors to write management utilities that plug in to ManageWise Command Center.

Novell has not determined how it will package this technology. ■

MANAGEWISE GETS HELP



The free ManageWise 2.1 Enhancement CD gives Novell's desktop and server management software a boost from the following third-party products:

Vendor	Technology
Alexander LAN	Server crash prevention tools
Atlantis Software	Alarm management
Geneva Software	Paging capabilities
Baranof Software	E-mail management
Kansmen	Database integration

Novell climbs into server clusters

Novell, Inc. last week gave BrainShare '97 attendees a peek at its Wolf Mountain server cluster technology. This technology which will be built into future versions of IntranetWare to make it a more scalable and fault-tolerant application platform.

Wolf Mountain will let customers cluster servers via an interconnect protocol and high-speed physical links based on technologies including 100M bit/sec Ethernet and ATM, according to Vic Langford, senior vice president of Internet technology at Novell. These servers will be connected logically via an object-oriented storage infrastructure and will appear to administrators and end users as a single system via Novell Directory Services or any other Lightweight Directory Access Protocol-based directory service.

Langford

Novell has been secretive about Wolf Mountain since work began on it in the fall of 1995. But in a BrainShare demonstration, Novell engineers showed Wolf Mountain connecting 12 servers, each powered by four 200-MHz Pentium Pro processors and running IntranetWare. The clustered system balanced the load of six Java-based applications. When engineers shut down four of the servers, the remaining ones assumed the processing responsibilities with no degradation to any of the applications.

Even though the technology looked ready to go, Novell officials would not commit to a product delivery schedule. While pieces of Wolf Mountain will be integrated into upcoming versions of IntranetWare, Langford said eventually it will run on other operating systems such as Unix and Windows NT.

Rich Walters, a technical specialist with Southern California Edison, said his company has been looking for the 99.999% uptime Wolf Mountain promises. "It's nice that Novell is opening it up now so we can plan for that redundancy," he said.

Microsoft is beta-testing its first phase of Wolfpack, which offers automatic failover between two NT machines, a process that Langford likened to what is supported with Novell's System Fault Tolerant III product today. Hardware systems that employ this failover version of Wolfpack are expected later this year. Microsoft is not expected to produce a version of Wolfpack that ties multiple servers together until 1998.

— Christine Burns

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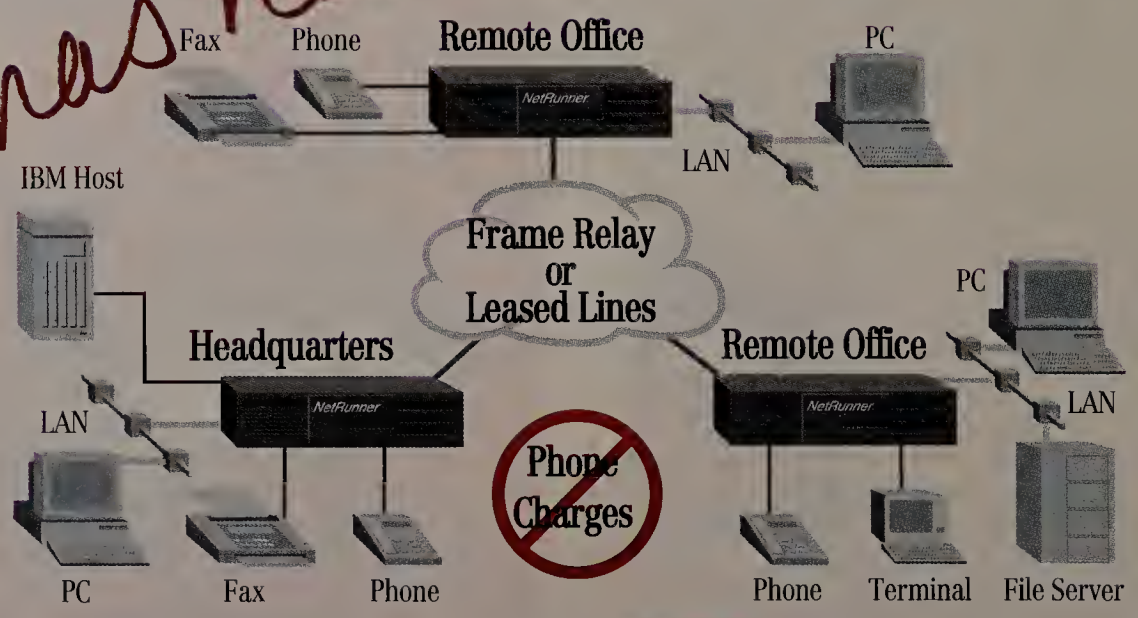

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Briefs

■ **Computer Network Technology Corp. (CNT)** *last week enhanced its Web Integrator family of Java-based software with support for JavaBeans application development. CNT's GreenBeans support will become part of the Web Integrator package, which is a* **Web-to-SNA integration** *product that provides legacy SNA application access to the Internet world.*

Hodgson

The idea behind GreenBeans is to let users or software vendors quickly build applets that can access legacy mainframe data, said Brian Hodgson, product manager at CNT.

GreenBeans support will be in Web Integrator Version 2.0 packages by mid-April.

© CNT: (612) 797-6700.

■ *Computer Associates International, Inc. (CA) has announced the Unicenter TNG Exchange Option for Microsoft Corp. Exchange 5.0 environments.*

Exchange Option includes intelligent agents for automating **Exchange server management** *tasks, CA said. Capabilities include real-time monitoring of server processes and disk space utilization, backup and recovery of Exchange servers, antivirus protection and real-time alarming.*

Pricing for Exchange Option was not disclosed.

© CA: (516) 342-5224.

■ *Government and research entities in North Carolina have powered up one of the first* **Internet 2** *networks for bringing together academic institutions. GigaNet is an* **OC-48 speed** *net linking researchers at MCNC, Duke University, North Carolina State University and the University of North Carolina.*

Internet 2 is the next-generation backbone network designed to provide high-bandwidth services such as video streaming and distance learning applications.

WilTel in line to take over more Nortel distribution responsibility

Nortel's former RBOC distribution arm is up for grabs following SBC-Lucent deal.

By David Rohde
Houston

The nation's largest distributor of Northern Telecom, Inc. telephone and networking gear may take on an even bigger role following Nortel's loss of a major telephone company distribution agreement.

Industry sources said Williams Telecommunications Systems, Inc., better known as WilTel, is in talks with Nortel to buy Nortel Communications Systems (NCS), a division of the company that is largely responsible for distribution on the East and West Coasts.

The discussions have acquired urgency since Nortel lost its distribution agreement earlier this month with SBC Communications, Inc., the regional Bell operating company for five Southwestern states. SBC signed up rival Lucent Technologies, Inc. as its preferred supplier of new equipment, although it will continue to support existing Nortel accounts.

The initial impact of such a deal would be on sales of PBX and call center equipment. Most user prospects for Nortel's Magellan ATM and frame relay switches probably will continue to deal directly with Nortel for now.

During the past few years, the NCS division essentially has taken over Nortel distribution from Pacific Telesis Group and NYNEX Corp. While RBOCs such as Pacific Telesis and NYNEX have moved away from the sale and support of telephone equipment, WilTel has roared into the market and has diversified by purchasing LAN and WAN network integrators in various parts of the country (see graphic). Such activity picked up two years ago after WilTel's parent company, an oil pipeline firm, sold off its carrier network to what is now WorldCom, Inc.

"It makes sense for WilTel to grab the Nortel base on the coasts," said Allan Sulkin, president of TEQConsult Group, Inc., a Hackensack, N.J.-based consulting firm.

A principal driver of such a move could be the pending merger between SBC and Pacific Telesis, since Lucent could use its new relationship with SBC to gain new distribution channels on the West Coast.

"Nortel's got an interesting challenge, and it relates to California," said Peter Bernstein, president of Infonautics Consulting, Inc. in Ramsey, N.J. "Now they have to decide, do we sell the whole shooting match to our best and most loyal distributor and tie them to a long-term contract?"

The initial impact of such a deal would be on the sales of PBX and call center equipment. Most user prospects for Nortel's Magellan ATM and frame relay switches probably will continue to deal directly with Nortel for now.

But Sulkin noted that Nortel recently made available to its distribution channels the new Meridian Passport option, which melds a Meridian 1 PBX and Magellan Passport data switch into the same cabinet.

And WilTel President Harry Hirsch said Nortel is beginning to make the Magellan line available to larger distributors.

"We just signed a data distribution agreement with Nortel to give us access [to Magellan]," Hirsch said.

Both Hirsch and a Nortel spokesman declined to comment on the reported talks involving Nortel's distribution arm. ■

ABOUT WILTEL

A look at Nortel's largest distributor:

FULL NAME: Williams Telecommunications Systems, Inc., a subsidiary of Williams Communications Group

FOUNDED: 1985

PRESIDENT: Henry Hirsch

NUMBER OF EMPLOYEES: 3,200

U.S. OFFICES: 108

RECENT ACQUISITIONS: Digital Frontiers – Web site development firm
Comlink – regional voice and data systems integrator
SoftIRON Systems – regional data network integrator
Critical Technologies – network design firm

Ganymede pumps up network testing tool

By Michael Cooney
Raleigh, N.C.

Ganymede Software, Inc. last week boosted its performance test package by adding the ability to evaluate Novell, Inc. NetWare nets and Internet traffic and measure data compression ratios.

Chariot 2.0 is a software-based performance measurement tool that lets users simulate the traffic generated by new client/server applications and predict the impact those applications will have on enterprise network performance before they are widely deployed.

"Chariot lets users stress-test the network, isolate problems and help network managers ensure that service-level agreements are being met," said Steve Joyce, vice president of marketing at Ganymede.

Chariot consists of an OS/2 or Windows NT server-based console application and agents for Windows 3.1 and Windows 95, OS/2, AIX, HP-UX and Sun Solaris clients. It supports SNA, IPX/SPX and TCP/IP communication protocols.

Chariot lets users build test applications, or scripts, which are distributed to the agents. It comes with script templates, or users can build their own, Joyce said. Agents then run the script between the client and server console. After a test is completed, the agent sends the results back to the console application, which compiles the results and presents them on the console screen.

The test measures response time and throughput of the agent and the net devices — such as routers, switches or frame relay access devices (FRAD) — that are between those agents and the console, Joyce said. "Administrators can see immediately the flow of the application and locate a problem or bottleneck and fix it," he said.

With Chariot 2.0, NetWare users can now measure end-to-end net performance. Another new feature lets users determine the data compression level of data flowing between data communications devices.

"Routers, FRADs, modems and other remote access devices use data compression to improve throughput and improve performance, but users had very little way of knowing how that function was working until now," Joyce said.

Chariot 2.0 also includes new scripts that let users emulate File Transfer Protocol, HTTP, Post Office Protocol 3 and telnet Internet sessions, making it easier to gauge response times for corporate intranet applications or Internet access.

Another new feature will let users group multiple clients as a single unit so users can run tests on multiple protocol and application types simultaneously.

Chariot 2.0 will be available by mid-April. Console prices start at $9,000 and client software at $2,000.

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INTERNETWORKING MONITOR

NICs in NT: A long way from Zero Admin

Zero Administration. You see it everywhere nowadays. I'm not sure what it means, but it sounds great. The mere thought of networking sans work will likely be enough to make some network managers lightheaded. But before I give your manager the good news about this newest networking nirvana, a dose of reality might be in order.

The Tolly Group recently completed an ease of administration study of what are undoubtedly pre-Zero Admin products. And if what we observed is indicative of the industry (and I believe it is), Zero Admin might only be reached when frustration levels cause all the administrators to do themselves in and we have no one left to administer. In our study, we attempted the simplest of tasks: installing network interface cards (NIC) under Windows NT 4.0. The evaluation process was eye-opening. The impediments unintentionally erected by various vendors illustrate how difficult it is to make something easy — let alone reach Zero Administration. Without naming names, here are some highlights, or rather, lowlights, to keep in mind when shopping for NICs.

Kevin Tolly

Traditionally, NIC vendors have relied on stand-alone DOS programs for adapter diagnostics and configuration. So perhaps it is not surprising when the vendor's first instruction for an NT install is "boot to DOS." For the NT installer, this means booting DOS from a diskette since it is highly unlikely the machine is a dual-boot DOS/NT machine. It would be helpful if the NIC vendor provided its diagnostics and setup program on a bootable DOS diskette. Most don't.

You can try to run these programs under NT's DOS and they'll execute. But, because NT's architecture deliberately hides the hardware from user processes, the program will report that the NIC (that you just installed) is not there. Of course, you know it is. (Frustrated yet?)

Under Windows 95 and NT 4, driver installation is supposed to be a breeze: Click on "Add Adapter" followed by "Have disk" and get the path to the drivers and you are done. In fact, all you need to know from the NIC vendor is the name and location of the driver.

Simple, right? Hardly. To find out that info, some vendors force the installer to boot to DOS to run the so-called installation program. Paradoxically, the installation program is sometimes nothing more than online instructions for manual installation. In some cases, the installer has to plow through documentation just to find the magical "driver path" needed to proceed with installation.

Once, after locating and entering the driver path, we were confronted with three possible drivers to load. Normally this is not a problem, but here not one of the driver names matched the name of the NIC we just installed. To proceed, we chose the empirical method — also known as trial and error. Eventually, we found the proper driver.

Had enough? I have. Don't get me wrong, I'm all for Zero Administration. But I'll believe it when I see it.

As for NIC vendors, the moral of the story is that they must rethink, not just repackage, when developing products for new operating systems.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.

Special Focus

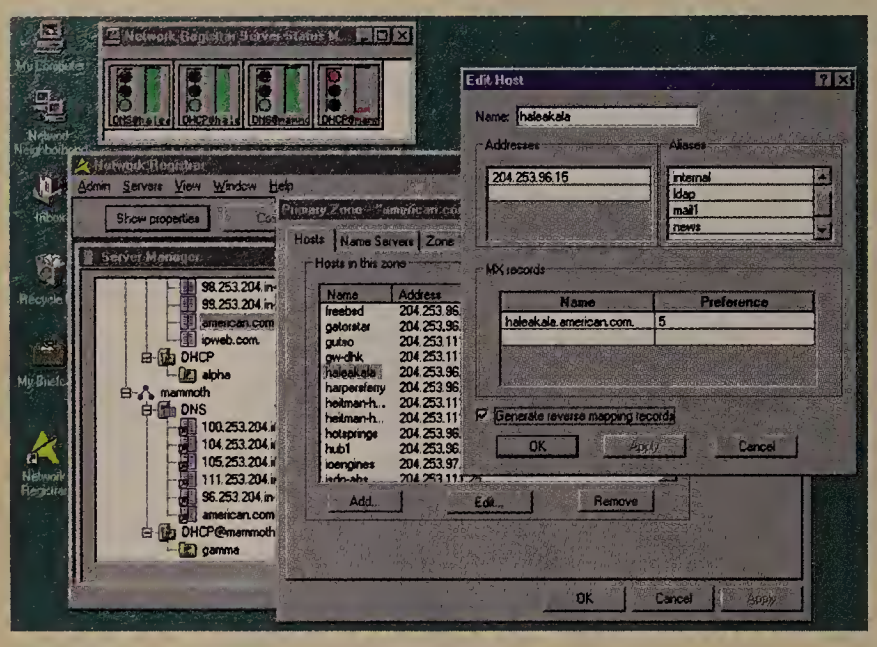
NETWORK MANAGEMENT

IP address management raises some sticky issues

By Jim Duffy

Time was when TCP/IP was relegated to Unix workstations in pockets of engineering workgroups within corporations.

Now, TCP/IP is *the* mission-critical protocol for the entire corporation. And TCP/IP's ascendancy is driving the need for IP address management systems.



American Internet *claims its new Network Registrar provides standards-compliant Dynamic Host Configuration Protocol services.*

As companies add more TCP/IP hosts to their networks, keeping track of IP addresses for tens of thousands of nodes becomes as important as managing the links among them. But statically assigning and accounting for addresses is a time-consuming manual process that's prone to errors and impractical for distributed environments.

Automating this process as much as possible while enabling flexible address allotment for growing networks and mobile users is the top challenge companies face.

"[Users] want something more sophisticated than an Excel spreadsheet and [Domain Naming System] zone files" for tracking assigned and available addresses, says Tim Sylvester, network appliance product manager at Cisco Systems, Inc.

If duplicate IP addresses are assigned, networked clients can be knocked offline. Moreover, each assigned address needs to have a DNS name attached to it.

Cisco recently announced DNS/DHCP (Dynamic Host Configuration Protocol) Manager, which is software that automatically links dynamically assigned addresses to DNS names (*NW*, Aug. 26, 1996, page 1). But analysts have doubts about the future of DNS/DHCP Manager since Cisco acquired a stake in Software.com, Inc., which analysts say produces similar technology (*NW*, March 10, page 23).

Cisco is not alone, nor was it the first entrant in the IP address management space. Companies such as Accugraph Corp., Isotro Network Management, Inc. and Quadritek Systems, Inc. have been offering address management tools for years.

Others entering the field include Advanced Computer Communications, Inc., American Internet Corp., FTP Software, Inc. and MetaInfo, Inc.

Most of these companies offer products that help users automate IP address-to-name mappings, and monitor assigned and available addresses. But these challenges are magnified once users implement DHCP servers, switched networks and virtual LANs.

And looming on the horizon is IP Version 6, which promises a slew of addressing enhancements that may make the management conundrum even more puzzling, especially in mixed IPv4 and IPv6 environments.

"We haven't got to the point where the world has completely figured [IPv4 address management] out and is moving on to next-generation type issues," says Rod Anderson, president of Ottawa-based Isotro.

Among the issues IPv4 users have to grapple with now is the impact of DHCP. DHCP dynamically assigns IP addresses to workstations from a centrally managed configuration server, rather than forcing an administrator to assign and maintain IP addresses manually.

"You have to think about how you efficiently roll out and maintain these networks," says Joe D'Andrea, president of Quadritek in Malvern, Pa. "If not, you get anarchy out there. Anybody can plug in a DHCP server and start handing out addresses."

Oil giant Chevron Corp. has 30,000 IP hosts scattered among hundreds of locations. The company is using DHCP for newer nodes at smaller sites but using static "legacy" addresses for larger sites. Ironically, the static addresses are harder to track.

"Historically, what has happened at the larger sites is that you had a pool of addresses and then you would give them off to individual administrators within the site," says Michael Lewis, senior network engineer at Chevron in Houston. "As those pass from generation to generation, the people forgot what they had given out and what they hadn't given out. So when you try to implement DHCP, which expects to have a pretty clean address slate, you run into all sorts of problems."

Chevron is using American Internet's Network Registrar to clean up the address mess.

DHCP can also impact the security of IP networks, specifically with firewalling. Because DHCP assigns addresses dynamically from a pool of available addresses, users "lease" an address for as long as they need it and then return it to be leased by another user.

Meanwhile, firewalls associate a specific address with a specific user. If they cannot map a DHCP-assigned address back to a specific user, an unauthorized user may gain access to the network; the address is authorized to go beyond the firewall, but the user is not.

"You've lost the ability with DHCP to assure or guarantee the association of an IP address with a user," Anderson says. "That has repercussions in several areas, one of them being firewalls."

Isotro is looking at ways to provide DHCP-assigned address auditing so administrators can determine who used an address at a given time and correlate use to network events that occurred during that period.

Interoperability of DHCP clients and servers may also be a problem. DHCP clients provided by one supplier may not fully interoperate with servers from another, vendors acknowledge. And the Internet Engineering Task Force is currently working on a DHCP server-to-server protocol so servers can balance loads and back up one another.

Switched networks present another address management challenge. In switched networks, more LAN segments are attached to a router port, so more devices — and addresses — are in a single subnet. This may make it hard for IP administrators to locate all of the devices in a subnet with fixed-length subnet masks.

Some users, such as Eli Lilly and Co., are implementing Variable Length Subnet Masks (VLSM) to help alleviate the problem. VLSMs add a second subnet mask to the network address via an extended network prefix. Lilly, a user of Quadritek's QIP address management system, says this property will help locate all of the devices on switched segments in a subnet (*NW*, Nov. 25, 1996, page 19).

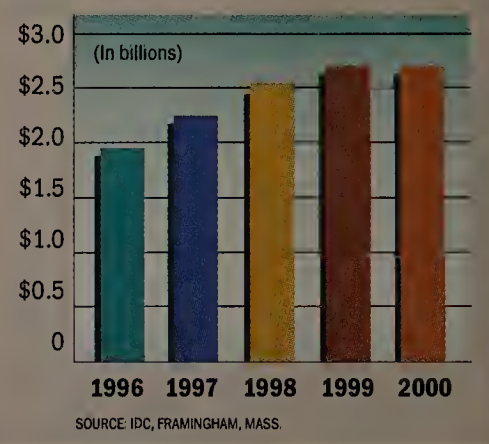
But VLSMs may make address management more arithmetically intricate, vendors say, which could make the task more error prone. Fixed-length subnet masks provide more numbering symmetry but are inefficient because they quickly exhaust address space.

"The task of VLSMs and how they play in the network topology become really complicated and cumbersome," says Arun Kapur, Quadritek chief technology officer and co-founder.

VLANs also complicate address management when users want dynamic VLAN and subnet assignment. If users have DHCP and network address-based VLANs, they're faced with trying to dynamically obtain an IP address at the same time as a switch is trying to assign the user to a VLAN based on an IP address.

Trouble is, you don't have an IP address yet. "You sort of have a chicken-and-egg problem," Sylvester says. "Since you don't know what VLAN you're on, you don't know what subnet you're on; so DHCP can't assign you an IP address." ■

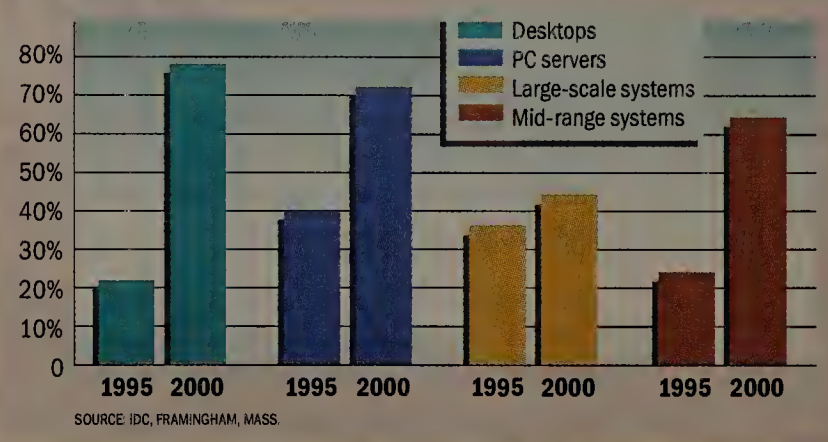
WORLDWIDE TCP/IP PRODUCT REVENUE



SOURCE: IDC, FRAMINGHAM, MASS.

MORE ADDRESSES, MORE DIFFICULTY

Worldwide penetration of TCP/IP into installed base by platform



SOURCE: IDC, FRAMINGHAM, MASS.

Carrier Services

Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ *Industry analysts have discounted a* Wall Street Journal *report that U.K.-based* **Cable & Wireless PLC** *is preparing to buy the 80% of* **Sprint Corp.** *not already owned by France Telecom (FT) and Germany's Deutsche Telekom (DT).*

"They're too small to make a bid for Sprint," said Leonard Elfenbein, president of Lynx Technologies, Inc., an international telecom consultancy and integrator in Fairfield, N.J.

"Wouldn't the more logical thing be for FT, DT and Sprint to pool their resources to buy Cable & Wireless?" asked Peter Bernstein, president of Infonautics Consulting, Inc. in Ramsey, N.J. Sprint and FT denied that they are encouraging overtures from Cable & Wireless to gain FT's support for a tender offer.

■ **Ameritech Corp.** *has purchased more than 500 of* **Lucent Technologies, Inc.'s** *Access Interface Units, which are designed to* **relieve Internet-related telephone network congestion.**

■ *San Jose, Calif.-based* **Nokia Telecommunications,** *a division of Nokia Corp., is teaming with Data Fellows to offer secure* **wireless intranet** *solutions for GSM-based service providers. The companies last week agreed to let Nokia integrate Data Fellows' F-Secure virtual private network encryption software into its Artus GSM-based wireless data networking products.*

© Nokia: (800) 368-4351; Data Fellows (408) 224-9090.

■ **Communications Satellite Corp.** *in Bethesda, Md., is offering its users* **wireless ATM** *services over all of its satellite networks. COMSAT will provide fractional T-1 (1.544M bit/sec) to DS-3 (45M bit/sec) ATM satellite connections to network managers and carriers that need to support broadband speeds to areas where it may be difficult to deploy fiber. The services are priced between $13,240 and $164,000 per month.*

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Global 800 numbers generate more interest than action

Summer launch now possible for Universal International Freephone Numbers.

By David Rohde

A set of administrative complications has delayed the start of global 800 numbers, but usage could be heavy once the new system finally gets underway.

The International Telecommunication Union (ITU) has told U.S. and foreign carriers that it needs until the end of June to process the more than 20,000 applications it has received for Universal International Freephone Numbers (UIFN).

UIFNs are special telephone numbers, consisting of the number 800 plus eight additional digits, that are designed to work the same way anywhere around the world.

North American companies in particular are expected to advertise UIFNs globally to bring callers into their multinational call center networks.

Originally, UIFNs were expected to be in commercial use by now (*NW,* July 15, 1996, page 23). But of the 20,000 applications received, 17,000 arrived by Feb. 1, and each application has an equal right to the requested numbers, according to the ITU's rules.

The ITU has asked for more time to determine which organizations get which numbers, especially since many applicants seem to have bid for easily remembered "golden numbers."

Even after the ITU assigns the numbers, users may face additional delays because of the global scale of the project.

Even after the ITU assigns the numbers, users may face additional delays because of the global scale of the project.

In North America, all carriers that offer ordinary 800 and 888 toll-free service subscribe to a single carrier-network database. Each time a caller places a toll-free call, the network dips into that database to determine how to route the call.

By contrast, a single database does not exist for UIFNs, explained Judith Sherman, AT&T's product manager for global toll-free offers.

Instead, each of the 57 UIFN-authorized carriers around the world must create its own UIFN database. AT&T, for example, will have to notify each other carrier of AT&T's UIFN users and their numbers.

Sherman expects that when the first users are set to go, UIFN routing agreements will be in place mostly with European carriers, with some Asia Pacific Rim carriers possibly ready to go and Latin American countries lagging behind. Anticipating a rolling start, the International Toll-Free Forum, a group of 20 carriers, has asked the ITU to waive its rule that any user receiving a UIFN must put it into commercial use within 90 days or forfeit the right to the number.

AT&T officials said the UIFN holds great promise. "We have seen a lot of interest from customers who never considered using international toll-free before," Sherman said. "For one thing, before [UIFNs], you had to manage all those numbers."

But UIFN user success will come at a price. AT&T will charge subscribing companies the same per-minute prices as its existing international toll-free services, and that cost is substantial (see graphic). ■

AND YOU HAVE TO PAY THE TOLL, TOO

Users of Universal International Freephone Numbers should remember that 800-number calls originating overseas are a lot more expensive than domestic connections.

AT&T's basic rate per minute	Originating country
$1.68	Brazil
$1.74	France
$1.61	Germany
$1.93	Japan
$1.61	Netherlands
$1.39	U.K.

Term and volume discounts are not included. Rates given are for termination over a dedicated access line; switched access rates generally are higher.

Digital subscriber line

Will broadband costs keep access slow?

By Tim Greene
Sergeants Bluff, Iowa

The good news is the fastest digital subscriber line (DSL) technologies work great. The bad news is they still are too expensive to deploy widely, according to field-test results from MCI Communications Corp.

Technologically, asymmetric DSL (ADSL) performs as advertised, delivering up to 8M bit/sec download speeds over regular copper telephone lines, according to MCI test results gathered here. And that still makes ADSL a prime candidate for bringing telecommuting bandwidth to the home, the results show.

But the cost of DSL equipment would price high-end DSL services out of the range of all but the ultra-serious power users, according to Bob Massarella, MCI's chief engineer for its Iowa trials of broadband technologies.

Broadband services over cable TV networks face the same problem. While the gear to provision data services on those nets works, it costs too much to upgrade the networks to handle two-way traffic.

Massarella said the price of provisioning ADSL and cable remains more than $1,000 per line. According to Kieran Taylor, broadband specialist at TeleChoice, Inc., a consultancy in Verona, N.J., carriers are waiting for the price to come down to $500 or less per line.

Significant progress has been made with DSL gear. "They've cut the cost by 50% in the last eight months, and in another eight to 12 months, they will cut it in half again," Taylor said.

Regardless, MCI is about to tariff services based on those technologies in limited areas, which the company would not disclose. The limited offerings will give MCI a chance to try out pricing schemes and work out back-office details such as billing.

In addition, MCI will partner with local telephone companies

See **DSL,** *page 22*

MCI reports on DSL, cable

Trials of broadband technology by MCI indicate:

- The telecom reform requirement to let competitors buy unbundled local access lines will push development of digital subscriber line (DSL) services.
- Prices for the fastest DSL gear remain too high for widespread deployment.
- The cost of upgrading cable networks to handle two-way traffic is prohibitive in most cases.

Telecommuter phone bills may increase

FCC proposal could deny subsidies for second residential lines in favor of school and library entitlements.

By David Rohde
Washington, D.C.

If your company pays for second residential phone lines for telecommuters, a pending federal regulation could take a bite out of your budget.

A cost increase could result from a change the Federal Communications Commission is considering in the way telephone companies are subsidized for providing residential service. Under the proposal, the FCC would consider only one phone line per home eligible for so-called universal service support.

All residential lines have been priced according to their true cost as a matter of national policy, with long-distance carriers picking up the bulk of the tab in the form of access charges and other payments. Now, acting under provisions of the Telecommunications Act of 1996, the FCC is expected to extend the basic phone subsidies — plus entitlements to Internet access and other services — to schools and libraries in a new $2.25 billion program.

The FCC must compensate for these subsidies by removing subsidies from other areas, analysts noted. The result: Phone companies may be forced to price each home's first line at one rate and additional lines at higher rates, said Brian Moir, general counsel for the International Communications Association.

THE DECISION MAKERS?

Members of the Federal-State Joint Board on universal service

FCC commissioners:
- Chairman Reed Hundt
- Commissioners Rachelle Chong and Susan Ness

State utility commissioners:
- Julia Johnson (Florida)
- Kenneth McClure (Missouri)
- Sharon Nelson (Washington)
- Laska Schoenfelder (South Dakota)

State public council:
- Martha Hogerty (Missouri)

The FCC is slated to vote on the change in May as part of a 1 1/2-inch stack of proposals overhauling the nation's universal service regulations. Approval of the single-line proposal is considered likely because it was included in the November recommendations of the Federal-State Joint Board, a body authorized by Congress to draw up the rules and submit them for FCC approval (see graphic).

Earlier this month, several members of the Senate Commerce Committee took FCC Chairman Reed Hundt to task over the proposal. At a hearing, four members complained that the single-line proposal could hit rural customers who rely heavily on phone subsidies.

Four Senate committee members complained that the single-line proposal could hit rural customers who rely heavily on phone subsidies.

Moir said the impact throughout the Bell Atlantic Corp. region would be an average doubling of the monthly price of a second phone line.

Local carriers have expressed concern about the proposal, but Moir said their focus is aimed at another universal service proposal they like even less: one to deny subsidies for phone lines at second homes. Moir said the carriers told the FCC there is "absolutely no way" they can keep track of which customers are maintaining beach or ski-resort homes. ■

DSL

Continued from page 21

and municipalities to sell the broadband services. That will relieve some of the capital investment burden MCI would otherwise have to carry itself.

The technology trials also show that a big pipe to an Internet service provider does not necessarily solve speed problems. Instead, broadband access creates bottlenecks elsewhere, including the connection speed between a Web server and the Internet and the routers within the Internet itself, Massarella said.

Taylor said the Iowa testing disproved the theory that the very fast download and slower upload that ADSL supports would be ideal for Internet access.

Instead, the trials indicate that users want to use video and other interactive applications that require more upstream capacity. That validates the development of rate-adaptive DSL, which can even out the sizes of upstream and downstream paths. ■

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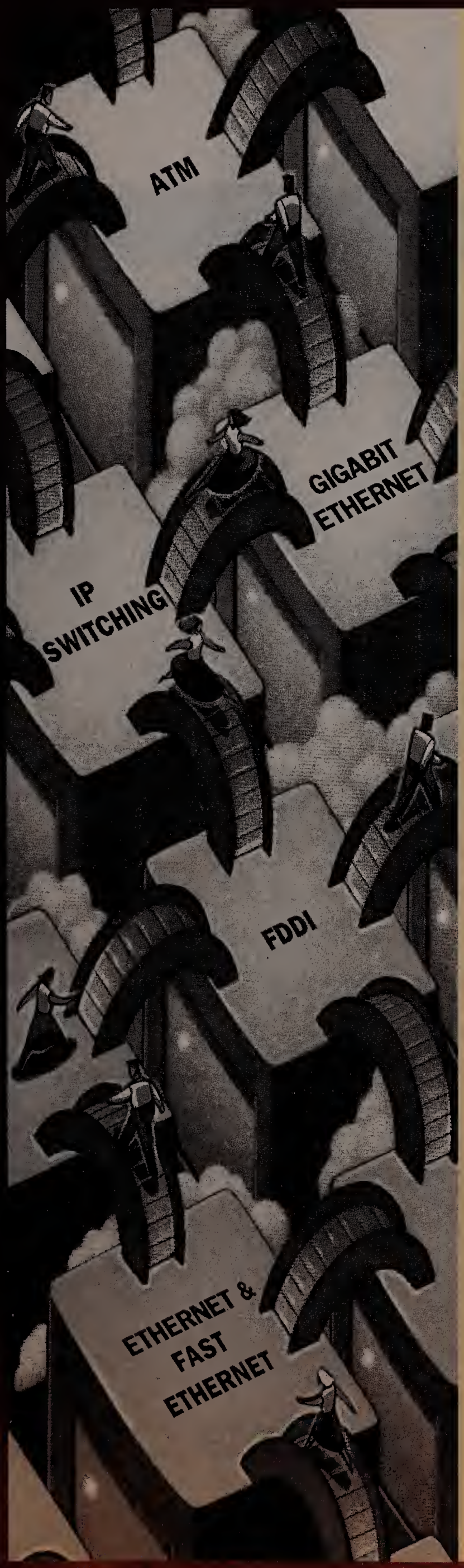

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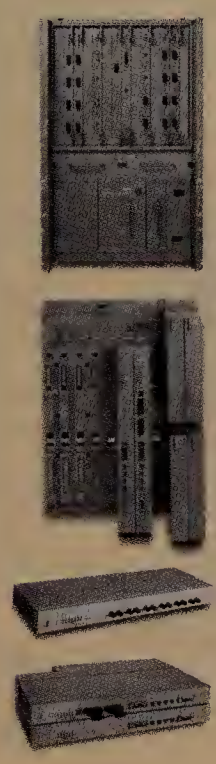

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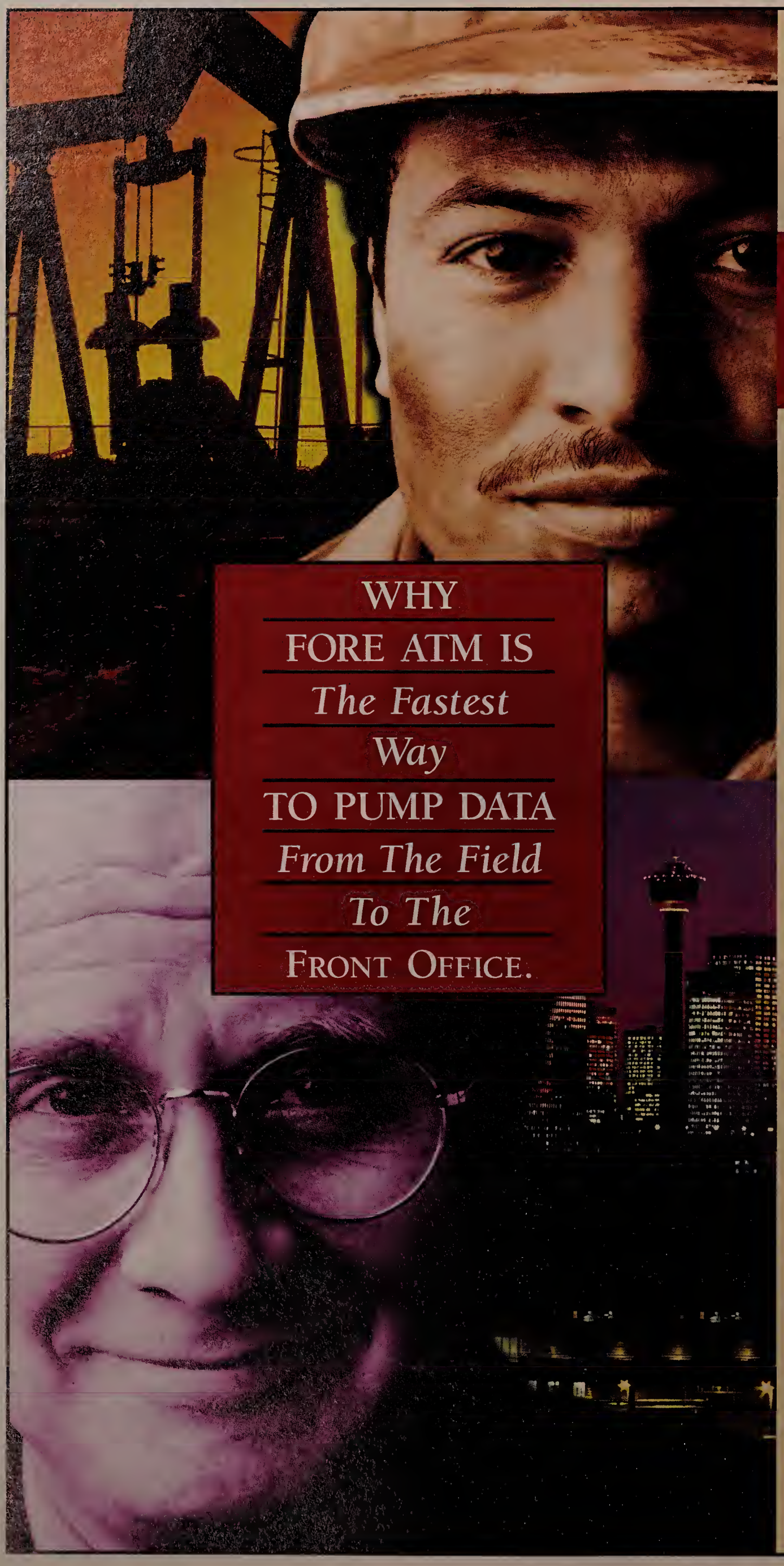

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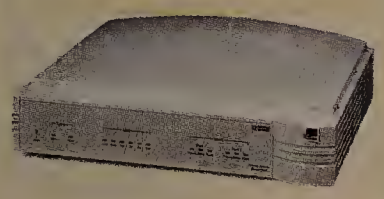
Briefs

■ **3Com Corp.** *last week bolstered its OfficeConnect family of* **small office/home office** *products with a new remote access server, router and hub. The OfficeConnect Remote Access Server 1000 supports two slots for PC card analog modems or ISDN terminal adapters, one Ethernet*



3Com's *new remote access server.*

connection and a serial port for net management. 3Com's NetBuilder 11x router offers one Ethernet LAN port and a WAN serial port for an ISDN, frame relay, PPP, X.25 or Switched Multimegabit Data Service link.

3Com also rolled out the OfficeConnect Hub TP16C, which is an unmanaged 16-port Ethernet hub.

Pricing for the remote access server is $1,195; the router costs $895; and the hub is priced at $225. All products will ship this spring.

✆ 3Com: (408) 764-5000.

■ *San Jose, Calif.-based* **Accton Technology Corp.** *last week rolled out a switch that offers a mix of* **Ethernet and Fast Ethernet** *ports. The SwitcHub is an eight-port device that supports six Ethernet ports, one 10M/100M bit/sec autosensing port and a Fast Ethernet link.*

The SwitcHub is priced at $1,995 and will ship in April.

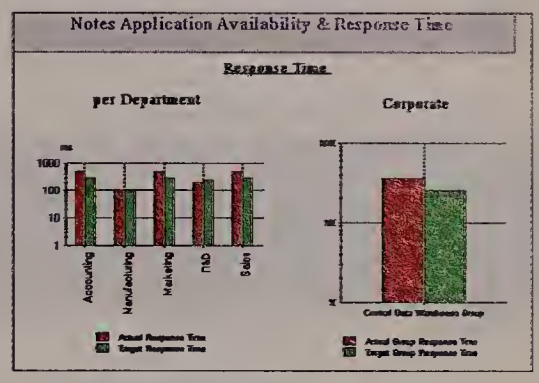
✆ Accton: (408) 452-8900.

■ **Intel Corp.** *last week introduced its first* **10M/100M bit/sec autosensing Ethernet print server.** *The NetportExpress PRO/100 allows workgroups to connect a parallel printer to an Ethernet network running at either 10M or 100M bit/sec. The device costs $399 and is available now.*

✆ Intel: (408) 765-8080.

3Com partners with start-up on network policy management

New InfoVista software lets customers set and manage policies.



3Com *has partnered with InfoVista to create management tools — such as InfoVista System 1.0 shown here — that lets customers monitor application response time.*

By Jodi Cohen
Santa Clara, Calif.

3Com Corp. last week announced it has partnered with French start-up InfoVista Corp. to provide customers with management tools for setting, managing and enforcing network policies. The software, dubbed InfoVista System 1.0, allows net managers to provide end users and applications with a specific level of service. With the software, for example, network managers can set and monitor bandwidth utilization and application response time.

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The InfoVista software works with all of 3Com's LAN switches, hubs, network interface cards, routers and remote access products. It also supports products from U.S. Robotics, which 3Com is in the midst of acquiring, as well as other vendors' SNMP-based gear.

"This is a must-have for providing full enterprise management capabilities," said Virginia Brooks, director of network research at Boston-based Aberdeen Group, Inc. "You're going to need bandwidth control, quality of service and policies that make sense for your business."

The InfoVista software can tap into data collected by 3Com's TranscendWare policy software, as well as multivendor gear on the network to provide a single view across networks, servers and applications. The software consolidates and measures historical and real-time information to manage service-level agreements.

Unlike some competing products from vendors such as Concord Communications, Inc. and Desktalk Systems, Inc. that rely mostly on SNMP and Remote Monitoring (RMON) for data access, 3Com-InfoVista customers can collect network data using SNMP, RMON, Ping and Proxy Ping. In addition, the software obtains systems and application information from log files, databases and third-party agents or management applications.

"This allows us to do things like get page processing times from Web servers," said Michael Cookish, product-line manager at 3Com. "That kind of information is collected from files that the Web server maintains, which can't be obtained via SNMP."

Customers can track how well they are meeting their service agreements using InfoVista's reporting capabilities. These capabilities include exception reports that provide service-level performance data for tracking trends. The software also offers summary reports of service-level performance as well as detail reports that let net managers view LAN and WAN equipment performance for troubleshooting and resource optimization.

The software, which runs on a Windows NT server and NT and Windows 95 clients, is priced at $19,995 and will ship in June. A Unix version will be available in the third quarter.

✆ 3Com: (408) 764-5000.

Start-up tackles Windows NT management

By Christine Burns
Houston

A 1-year-old start-up here has introduced its first product — a software package that gives network administrators control of distributed Windows NT desktops, servers and applications.

NuView, Inc.'s ManageX is an object-oriented application that captures real-time performance data from any NT machine on the network and enables administrators to track computer and application availability.

ManageX includes three parts: a monitor, modules and brokers.

The ManageX monitor can be used by administrators to gather data from NT systems, view performance trends and create management rules that manage servers and applications.

NuView's Functionality Modules are Distributed Component Object Model objects installed on each managed system that perform administrative tasks such as killing a process, rebooting a machine or carrying out registry synchronization.

Also installed on each managed system are Intelligence Modules, which are ActiveX scripts that call on the Functionality Modules to take specific action when defined thresholds are exceeded.

The third part of the package, ManageX Smart Broker, is a small application residing on each managed machine that allows the monitor and modules to communicate effectively across the network.

PROFILE: NUVIEW, INC.

Based:	Houston
Founded:	January 1996
CEO:	Rahul Mehta, previously founder and president of Software Interfaces
First product:	ManageX software for managing Windows NT desktops and servers, as well as the applications that run on them
URL:	www.nuview.com.

NuView also offers a central console for viewing activity from multiple ManageX monitors and for installing ManageX modules across a network.

NuView's software is better suited for managing NT nets than Unix-based enterprise management platforms, such as Computer Associates International, Inc.'s CA-Unicenter, said NuView CEO and founder Rahul Mehta. Mehta previously started a company called Software Interfaces, which was acquired by Platinum Technology, Inc. in 1995. ManageX taps into native NT services such as Performance Monitor, security authentication and the NT registry, he said.

Beta tester Ed Bianco, chief information officer at Lowell General Hospital in Lowell, Mass., said ManageX also is simpler to deploy and use than other products he has tested for managing his 12 NT servers.

"We had this up and running in 20 minutes," he said. "I get more capabilities out of this than I would have if I had spent hours writing management routines for NT machines based on the Unix-based products."

The complete ManageX product costs $1,495 per server and includes a performance monitor, console, smart broker and all modules.

Additional stand-alone performance monitors cost $495 per server.

✆ NuView: (281) 497-0620.

WIRED WINDOWS

Gang of Four goes after Microsoft

Sun Microsystems, Inc., Oracle Corp. and Netscape Communications Corp. over the past year or so have formed an informal coalition to go up against Microsoft Corp. You can now add Novell, Inc. to the group.

Novell's relationship with Microsoft has blown hot and cold over the years. Under Ray Noorda's leadership, Novell had a bitter rivalry with Microsoft. His successor, Robert Frankenberg, fostered greater cooperation between the two companies. But Novell partnered with Sun at BrainShare a year ago and embraced Java for applications and management. The fruits of that announcement are just beginning to be seen in beta software for NetWare 4.11.

Java, of course, is considered the major competition for Microsoft's ActiveX. Novell was evidently so enamored of Java that it has now named the godfather of Java, Eric Schmidt, as its chairman and CEO. The only surprise is that there hasn't been an announcement of a port of the Novell Directory Services (NDS) to Sun's Solaris platform. But it appears it will be just a matter of time until that happens.

Novell and Oracle have cooperated since the first release of OracleWare (Oracle7 on NetWare 3.12) almost four years ago. Last week, that partnership was extended as the companies announced greater integration of Oracle databases and applications with NetWare. All of Oracle's products will be NDS enabled, while Novell will work to support Oracle's network computer initiative.

Dave Kearns

Netscape, the other member of the anti-Microsoft coalition, has announced plans to spin off with Novell a private company called Novonynx. The company will license Netscape's SuiteSpot servers and marry them to NDS and other Novell technology. This type of thing is typically done via a cross-licensing deal or by simply agreeing to cooperate. But the word on the street is that Netscape CEO Jim Barksdale prefers separate entities that can sink or swim on their own.

Sun's Java, Oracle's databases, Netscape's Web servers and Novell's NDS working in unison — it's a formidable lineup.

Each of these products, on its own, is better than the comparable Microsoft offering — absolutely better or better because of its ability to run across different platforms. But it remains to be seen if this revitalized lineup can stop or even slow Microsoft's seemingly inexorable drive to dominate all facets of computing.

The bet here is that Microsoft is going to have to make some tough decisions and tighten its focus. Don't be surprised if Microsoft blinks first in the directory services battle.

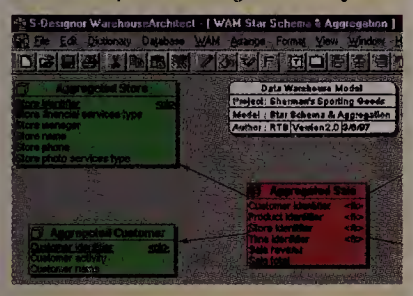
Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

Tip of the week

Tumbleweed Software Corp. is releasing a product that provides a very secure method for delivering messages and documents across the Internet. It combines E-mail, Web, encryption, scanning and a host of other technologies. It's too much information to adequately explain here, but browse www.tumbleweed.com and you can get the details.

Briefs

■ **Sybase, Inc.** *is readying Version 6.0 of its S-Designor database modeling tool set. Included will be the Warehouse Architect module for designing* **data warehouses,** *an HTML generator for*



creating Web sites directly from an S-Designor data model, and the ability to use models for generating applications from Optima++ and Delphi development tools. The modules are sold separately and priced between $295 and $4,995.

✆ Sybase: (800) 395-3525.

■ **Dascom, Inc.** *in Santa Cruz, Calif., is creating a version of its IntraVerse NetSeal* **security software** *for the Forte Application Environment, a high-end development tool set from* **Forte Software, Inc.**

NetSeal will create centralized application security for Forte developers, who will be able to control end-user access to distributed Forte applications.

The software establishes the user's identity and then grants access based on a central security policy.

✆ Dascom: (408) 457-4510.

■ **Blyth Holdings, Inc.** *in Foster City, Calif., has released OMNIS Web RAD 2.0, a tool set for building and running* **client/server Web applications.**

New features include a server agent that dynamically serves data to Web browsers, improved HTML conversion, error-handling facilities and a simplified installation process.

The tool set is available in several discounted configurations ranging in price from $999 to $2,499.

✆ Blyth: (415) 571-0222.

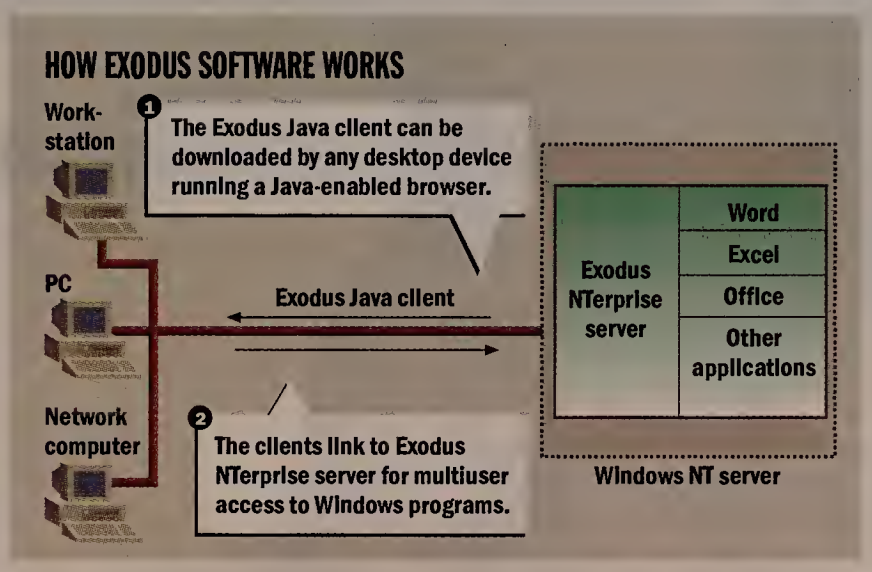
Windows application servers embrace Java for Web access

Exodus, Insignia and Network Computing Devices are among the Java believers.

By John Cox
Bellevue, Wash.

Vendors of Windows application servers have begun embracing the Java programming language to create Web-based access to popular desktop applications.

Exodus Technologies, Inc., based here, is the latest vendor to build Java connectivity into its multiuser Windows NT-based application server, dubbed NTerprise.



The company's approach is similar to that taken by Insignia Solutions, Inc., based in Santa Clara, Calif.

However, Insignia's NTrigue product is based on Citrix Systems, Inc.'s WinFrame multiuser version of Windows NT, rather than NT itself.

In addition, Mountain View, Calif.-based Network Computing Devices, Inc. (NCD) has announced a more powerful version of its Windows server software, which already allows network computers (NC) to download and run Java applets.

As for Exodus, the company's programmers wrote a Java applet that can be downloaded from its NTerprise server program to a Web browser or an NC. The applet talks to the server using a subset of the X Window System protocol to activate one or more Windows applications on the server. The end user can run the application within the Web browser's window or as a full-screen Windows display.

"[With this Java applet], tens of thousands of Windows applications are immediately available to run on a network computer," said Exodus President Stephen Kangas. "You don't have to wait for Windows applications to be rewritten in Java."

Unlike server products based on Citrix's WinFrame software, which adds proprietary multiuser features to NT, NTerprise runs as an NT application or service.

Insignia's Citrix-based product, the NTrigue Client for Java, is a Java applet that downloads to a desktop system from an Intel Corp. server running NTrigue application server software. The desktop browser or other Java-enabled platform can then access Windows applications running on NTrigue.

The applet will ship as part of the NTrigue Product Enhancement Pack 1.0 in March and will be available from Insignia's Web site (www.insignia.com). The applet also will be bundled on Sun Microsystems, Inc.'s JavaStation NC.

NCD's new WinCenter 3.0 also uses Citrix's WinFrame for Windows applications, but it lets end users access applications on Unix servers.

WinCenter 3.0 uses technology that lets any Java applet fit into what looks like a standard Windows interface, enabling end users to resize windows or turn them into icons using Windows conventions.

This version also spreads the client traffic load among several WinCenter servers and modifies the client boot protocol in an NCD NC to contact a WinCenter server when it is switched on.

Pricing starts at $465 per user for a five-user license.

✆ Exodus: (206) 803-5780; Insignia: (800) 848-7677; NCD: (415) 694-0650.

Tibco bridges ActiveX and Java

By John Cox
Palo Alto, Calif.

Tibco, Inc. this week will add support for ActiveX to its publish/subscribe middleware, providing companies with two-way links between ActiveX and Java components over networks.

Version 3.0 of The Information Bus (TIB) Rendezvous middleware, for example, will push an event or data from a Java applet running in a Web browser to ActiveX components or applications such as Excel spreadsheets on hundreds or even thousands of desktops.

Tibco's core TIB technology combines the benefits of publish/subscribe communications and multicasting.

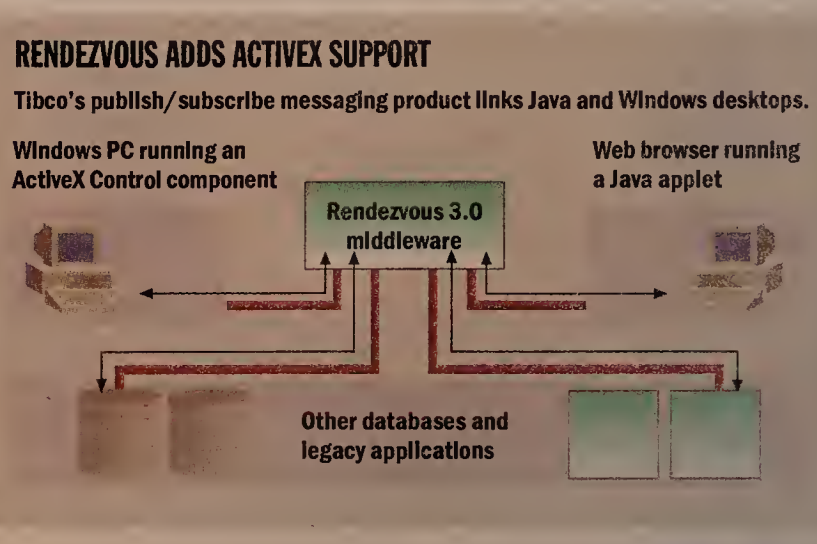
This lets applications sign up to receive messages when new information is created in a sending application but ensures that the information is transmitted over the network in an efficient manner.

Tibco also has updated its middleware to guarantee reliable communications. Certified messaging is a new feature in Version 3.0 that ensures messages sent from publisher to subscriber applications are received. The feature reports back to the publisher when messages are not delivered and makes continuous efforts to send the message until it goes through.

Also new to Version 3.0 is a fault-tolerance facility, in the form of a class library, that coordinates software processes over the network. If an active process fails, this facility triggers a backup process to take over.

Rendezvous 3.0 is available now and is priced at $495 per user. The software developers' kit costs $1,200. The software runs on a wide range of client and server operating systems.

✆ Tibco: (415) 846-5000.



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*SmartSwitches and the SecureFast VLAN Manager application received "Editor's Choice" and "Editor Refuses to Give it Back" awards in *Network Computing* magazine.

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SHARED LOGIC

Needed: Standard E-mail metrics

As E-mail products move toward commodity status, customers tend to focus less on features and more on bread-and-butter issues such as cost of ownership. After all, E-mail support costs can add up to as many as $2 million a year — a bigger concern for administrators than whether an E-mail package features the ability to pop a smiley-face graphic into a message.

Daniel Blum

Recognizing that customers need more information on cost of ownership, consultants responded late last year with reports comparing the cost of running the messaging products of Lotus Development Corp., Microsoft Corp., Netscape Communications Corp. and those of other vendors. The reports discussed key cost-of-ownership elements such as users per server, application development efficiency and administration resources per 1,000 users. The reports made their way onto the Internet with hot links from the winning vendors' Web sites.

Readers of the reports need to understand that the conclusions depend on the metrics picked as well as on often outdated assumptions used to work up the spreadsheets. One report assumed, for example, that Microsoft Exchange could support 2,000 users on a server and Lotus Notes only 50. Considering that the latter figure would only be true for old versions of Notes, this approach seems a bit like comparing a '97 Ford with a '57 Chevy.

Besides watching the consultants, you naturally need to watch the vendors when it comes to metrics. At one point, Microsoft claimed to have tested Exchange in the stratospheric realms of more than 20,000 end users per server.

But the benchmarks do not point out that since the Exchange message store supports only 16G bytes of total storage space, each end user would get less than 1M byte of storage.

Customers, vendors and consultants are focused on the number of users per server not only because it is an important metric, but because it is a simple one to understand.

But until the industry agrees on some basic assumptions, measuring the number of end users per server is as useful as "counting the number of angels dancing on the head of a pin," according to Mike Zisman, Lotus' executive vice president of strategy.

As my partner Gary Rowe says, "The bottom line is that the industry is in dire need of an objective assessment of the key elements that can be measured. Until there is an industry-level assessment, any numbers may represent a biased view."

Like the database industry, whose Transaction Processing Council long ago developed basic metrics for measuring the number of transactions a database can support, the messaging industry must lay down the ground rules for measuring parameters such as users per server and messages per hour.

We must also define basic conditions of satisfaction, such as a reasonable number of megabytes available for user storage and statistically realistic logon/logoff activity and message sizes.

All of these parameters need to be defined by an independent organization, such as the Electronic Messaging Association, with plenty of input from customers.

Once we have some measurement standards, vendors such as Lotus, Microsoft, Netscape and Novell, Inc. can take their products in for torture testing. Only then will customers be able to compare apples with apples.

Daniel Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached via E-mail at dblum@mindspring.com or via the Web at www.rapport.com.

Kiva boosts Internet server performance

Company also adds Java support and executives.

By John Cox
Mountain View, Calif.

Kiva Software Corp. will announce at the JavaOne conference here this week that it has added muscle to its Internet applications server software, along with support for Java applets.

The changes underscore the 2-year-old company's goal of delivering high-performance application services that link browser-equipped clients with back-end databases and legacy systems. The three-tier software framework acts as a foundation for transaction-oriented Web applications.

For Version 1.5, Kiva engineers fine-tuned Kiva Enterprise Server's (KES) engine. Company executives claim the new release yields up to a 400% increase in performance and scalability compared with Version 1.0.

Kiva has created and documented its own benchmark test in which KES 1.5 handled 12,000 transactions per minute for as many as 6,000 simulated users.

The test involved running the software on a four-processor Sun Microsystems, Inc. Ultra Enterprise 4000 server. Kiva designed the test to reflect an actual Web application, with actions for completing an online form and submitting the form via a browser.

NEW IN RELEASE 1.5 OF KIVA'S INTERNET APPLICATION SERVER

- Server engine runs four times as fast as previous version
- Java client support
- SDK support for four additional tools: Microsoft's FrontPage 97 and Visual Studio 97, SoftQuad's HotMetal and Symantec's Visual Cafe Pro

The Java client support means Java applets can now interact directly with KES via the Common Object Request Broker Architecture's Internet Inter-ORB protocol. Previously, Kiva's software generated only HTML screens, with a Web server between the browser and the Kiva server.

Now, Java and HTML clients can access the same server-based applications.

Kiva also has bolstered its product line by releasing a new KES software developers' kit (SDK) that lets developers work with more third-party tools (see graphic).

The tools can be used to create Web interfaces and write server-based logic for deployment in Kiva's three-tier model.

The Kiva server and SDK are available on Windows NT, Solaris and HP-UX. Pricing for KES starts at $25,000 per server for NT and $35,000 for Solaris or HP-UX. The SDK costs $995 per developer.

Separately, Kiva announced additions to its top management team. Skip Glass, formerly a vice president at Sybase, Inc., is chief operating officer; Vice President of Marketing Ken Nicolson was previously director of marketing at Red Brick Systems, Inc.; and Ron De Hoff, formerly director of customer engineering at General Magic, Inc., is senior director of professional services and support at Kiva.

✆ Kiva: (415) 526-3900.

ZooWorks tames Web beast

By Paul McNamara
Santa Clara, Calif.

Keeping track of truly useful URLs can be difficult enough for an individual, never mind a workgroup of employees needing to cull and share information gleaned from the World-Wide Web.

With the hope of turning chaos into effective collaborative surfing, Hitachi Computer Products America, Inc. has released a product called ZooWorks Research for Teams 1.0. The server software indexes and manages a pool of Web-page information contributed by as many as 50 workgroup members. These employees then use the locally stored data for offline searching and online retrieval.

Analysts and users believe Hitachi may have caught on to something.

"The normal way we think about the Web is in terms of individuals accessing information and incorporating it into their everyday work activities," said Geoffrey Bock, a consultant with the Patricia Seybold Group, Inc. in Boston. "But the whole point is that people don't work alone; they work in teams. They want to amplify their own work activities based on what their coworkers are doing, and that's where ZooWorks for Teams comes in."

ZooWorks Research for Teams allows for full Boolean searches using keywords, folders, a date or a range of dates.

The product provides automatic maintenance and purging of URLs within the index based on age or last access date. One early user calls the software "a cheap thrill" because it has saved his staff time and money.

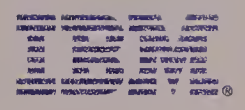
"The actual [index] data itself resides on our server, so it essentially minimizes our connect-time charges," said Kevin Amazon, managing partner at Python Marketing, a 15-person sales and marketing consultancy in Livermore, Calif. "We can slice and dice that information in a number of ways."

Accessible via any browser, the software runs on Windows 95, Windows NT Server or Windows NT Workstation and requires a Pentium 133-MHz processor, 32M bytes of RAM and at least 10M bytes of disk space.

ZooWorks Research for Teams 1.0 costs $795. It includes 10 free copies of ZooWorks Research Personal, client software that allows individuals to collect and index URLs locally.

✆ Hitachi Computer Products: (408) 986-9770.

ZooWorks Research for Teams 1.0 *from Hitachi Computer Products stores and indexes Web information for workgroups of up to 50 members.*



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A lot of the innovative lightning on the Windows NT platform is coming from an unexpected direction.

The first object-relational database for Windows NT.* DB2® delivers native BackOffice* performance with bulletproof integrity and whole-enterprise scalability. Extenders let you add multimedia objects (blueprints, training videos, mug shots of the CEO!) to traditional data at your own pace. Developers work in Visual Basic,* leveraging skills. Built-in Java* gives you a straight shot to the Web.

The leading asynchronous messaging solution that integrates Windows NT and non-Windows NT applications – without writing lots of new connectivity code. And without the usual backups and breakdowns. Bank-vault secure (which is why so many banks use it), IBM's MQSeries™ is the applieation connection for over 20 platforms. And a product to remember in case of sudden mergers or reorgs.

www.software.ibm.com/nt

Software Solutions from IBM: Enhancing NT

IBM has already helped over 1,200 businesses move critical functions to Windows NT. To see how, and to download product evaluation code, click on www.software.ibm.com/nt.

The first transaction server for Windows NT provides a secure and scalable platform for business-critical applications with excellent synchronous connections to existing transaction systems. With multiple-choice programming environments (Visual Basic, Java, Powerbuilder,* VisualAge™), Transaction Server* for Windows NT kick starts development of new apps. FYI, IBM is the world leader in transaction processing. Nice to know, when "Oops!" is not an option.

The first communication emulator for NT that integrates host access and Internet access with the same user interface. As an emulator, PCOMM frees you to select the backbone protocols of your choicc, helping keep network support costs down. The Web connection launches automatically when users click on URLs in notes or files. Shazam! They're at that site. From host access to Web connections, happy users/happy you. Neat trick.

yes NetWare

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NETWORK PERIPHERALS

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Briefs

■ **Adobe Systems, Inc.** *this week introduced Acrobat Capture 2.0, software for* **bringing paper-based documents online.** *Used with a scanner, the software enables companies to convert paper documents into Portable Document Format files, which can then be distributed and accessed across intranets or the Internet. Acrobat Capture 2.0 will run on Windows 95 and Windows NT and is scheduled to ship in May. It will cost $895.*

■ **MCI Systemhouse** *last week announced it won a $5.1 million systems integration contract with Texaco, Inc. MCI will provide a commodities trading system for* **real-time data-tracking** *of oil prices and other trading logistics around the globe.*

■ *Mississauga, Ontario-based* **Certicom Corp.** *last week began shipping the Elliptic Curve Cryptography Toolkit, a developers' tool kit to add* **public-key cryptography** *to applications. Certicom Chief Technology Officer Scott Vanstone said elliptic-curve cryptography, based on an elliptic logarithm, is about 10 times more computationally efficient than RSA Data Security, which uses mathematical factoring.*

Vanstone

■ *Pittsburgh-based* **CKS North America** *last week began shipping MyNet 2.2, a* **single-logon software product** *that gives security managers a single point of administration and control for user identification and passwords. MyNet supports Windows, OS/2 and DOS clients. Servers supported include NetWare 3.X and 4.X, IBM's LAN Server and Windows NT Server. Oracle Corp. databases, Lotus Development Corp.'s Notes and Netscape Communications Corp.'s Commerce Server are among the agent connections available.*

© CKS: (800) 321-9004.

Security

Gradient launches secure single logon

Separate authentication methods no longer needed.

By Ellen Messmer
Marlborough, Mass.

Gradient Technologies, Inc. this week will take the wraps off NetCrusader, a single-logon security management system that promises to eliminate the need for separate authentication methods for Web, database or remote token-based access.

Set to ship this summer, NetCrusader will give administrators a way to integrate the authentication methods they may already have in place, such as Distributed Computing Environment (DCE) security services, X.509 public-key certificates or simple password and ID logons, including token-based dynamic passwords.

Gradient's *Fowler says, "This is a security infrastructure that will give you a common access-control system."*

El Segundo, Calif.-based Hughes Communications, Inc. is testing NetCrusader as a method of controlling what information each user can view on the corporate intranet, right down to each hyperlink and tag on a Web page.

"I can selectively control what is visible on that page," explained Mark Michael, the company's architect of distributed computer architecture.

A NetCrusader software component called WebCrusader 3.0 gives Hughes Communications a way to establish fine-grain control over its internal Web content while making use of the DCE security service for encrypting passwords and IDs already in place.

With DCE controls, a custom client application has to be written. But with NetCrusader, the user can be authenticated using just a Web browser, Michael said.

Hughes is testing NetCrusader with Netscape Communications Corp.'s Navigator.

David Fowler, vice president of sales and marketing at Gradient, said NetCrusader supports Netscape and Microsoft Corp. Web servers, though he noted that the two use different methods to authenticate X.509 certificates.

"Each Web server has its own authorization model, unfortunately," Fowler said.

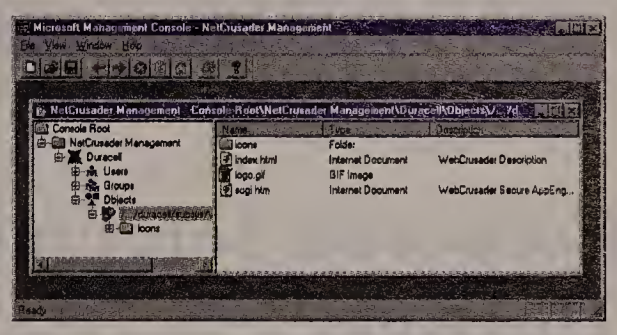
The central piece of the NetCrusader package is NetCrusader Commander 1.0, a Windows NT-based repository for user security profiles, the permissions granted for accessing applications and data.

Another NetCrusader component, the AppCrusader 1.0, lets the administrator apply access controls for a TCP/IP-based networked application.

"Usually there is one security tool for the database, one for the Web server and one for the physical box," Fowler said.

"NetCrusader lets you create a security infrastructure with a common access-control system that touches on all of these."

© Gradient: (508) 624-9600.



NetCrusader Commander *lets administrators manage user access to network resources and applications through a single repository.*

QUICK TAKE: REDCREEK COMMUNICATIONS

Start-up RedCreek Communications, Inc. last week began shipping Ravlin 10, a $3,500 security device that plugs in to an Ethernet LAN to encrypt and authenticate IP traffic across an intranet or the Internet.

Ravlin 10 uses standards such as the 56-bit Data Encryption Standard, IPSec and the Internet Secure Association Key-Management Protocol.

Ravlin 4 with 4M bit/sec throughput, priced at $1,300, also shipped last week. A Fast Ethernet version, called the Ravlin 100, is expected to be out in September. Early next year, the Ravlin 155 for ATM should debut. In May, RedCreek will offer free client software for encrypting between a mobile PC and the Ravlin hardware.

RedCreek: (510) 745-3900.

Multicasters get clue about users

StreamWatch tracks viewing patterns.

By Chris Nerney
Palo Alto, Calif.

New software from an IP Multicast start-up could give broadcasters of online video and audio programs detailed information about audience demographics and quality of reception.

Precept Software, Inc.'s StreamWatch is designed to measure usage patterns of multimedia applications broadcast over corporate intranets and the Internet. StrreamWatch will track the number of viewers and their identities, when the viewers tuned in and the quality of each user's reception.

StreamWatch works by tapping in to multimedia multicast datastreams that use Real-time Transport Protocol.

Such information would allow corporations to bill viewing time to specific departments. It would also let online content providers set advertising rates and allow IS managers to monitor the network for trouble spots.

"If StreamWatch shows that a cluster of users are getting high error rates, a network manager would know there's a router or a segment of the network that's dropping more packets," said Precept President and CEO Judy Estrin.

StreamWatch works by tapping in to multimedia multicast datastreams that use Real-time Transport Protocol (RTP), a network transport standard for real-time audio and video.

The Windows-based software was developed originally for users of Precept's IP/TV multicast product. However, StreamWatch also can be used to monitor any streaming product that uses the Internet Engineering Task Force's RTP and IP Multicast standard protocols, Estrin said.

She added that StreamWatch is not a threat to user privacy because it looks only at information regarding the viewing of the multicast transmission, not at the content itself.

Don Miller, chief analyst of networking services at Dataquest, Inc., called StreamWatch "a nice adjunct tool that really adds some value because you can actually fine-tune how you're deploying your stuff."

StreamWatch is available now and is priced at $995 per copy.

© Precept Software: (415) 845-5200.

'NET INSIDER

Well-presented confusion

Far be it for me to plug another publication, but the March issue of *Business Communications Review* is quite impressive. At the same time, it's a bit depressing. The issue covers many useful and interesting topics with only one or two clinkers.

The juxtaposition of John McQuillan's column, "Deconstructing ATM," and Jim Mollenaur's article, "New Prospects for ATM Flow Control," typify the tone of this month's issue. In his column, McQuillan dances around the issue but can't quite bring himself to say that ATM to the desktop is a future — like helicopters in everyone's backyard (a favorite prediction in the '50s) — that never was to be. The column comes close to being an obituary for ATM. McQuillan does predict a new ATM will rise from the wreckage consisting of the "best parts of ATM" and of other net technologies.

Coming from a person who was once one of ATM's strongest supporters, this column is something of a watershed.

In his article, Mollenaur seems oblivious to end-to-end ATM's questionable future and touts a version of credit-based flow control for ATM. Credit-based flow control was voted down in the ATM Forum a while back, but in Mollenaur's article, it has risen again from standards-process purgatory.

A question that I've had for a while concerns virtual LANs. In his article, "Switching: In Search of the Hassle-Free Network," Tom Nolle writes as if everyone is using VLANs. I don't mean VLANs as a way of splitting a big Ethernet switch into subnets, but VLANs that decouple the physical and logical topologies of nets. Just as they did when talking about ATM, many pundits now talk as if there will be an inevitable, ubiquitous use of VLANs.

Over the past year or so, during the *Network World* Fast LAN seminars and the Strategic Networks NetSwitch seminar series I teach, I've asked attendees how they use VLANs. I don't ask about their plans, because plans can change quickly when reality overcomes the glow of the marketing demos. Instead I ask about their current usage patterns and equipment orders. Even though many vendors push VLANs very hard, I find few people are buying. I'd be interested to hear if readers are actually using VLANs. Or are VLANs yet another pundit-driven alternate-world technology?

Scott Bradner

The magazine also contains a good article by Fred Baker, "Lies, Damned Lies and RSVP," which successfully imposes a bit of rationality on the overhyped area of network quality of service, including ATM and Resource Reservation Protocol QoS. Aligning expectations with reality in this area is not easy because so many people with little understanding of QoS technology — the authentication, authorization and accounting issues involved, or the "interesting" challenges involved in scaling the QoS technologies to deal with the Internet — have been painting a rather rosy picture of a QoS-filled future.

All in all, the magazine is representative of the confusion that confronts anyone trying to figure out in which direction they should head with their network.

Disclaimer: Harvard does not sell confusion, just multiple views on the same topic — these are mine.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached via the Internet at sob@harvard.edu.

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.

I'm looking for information on Novell, Inc.'s Mirrored Server Link (MSL), which I believe also is called System Fault Tolerance (SFT) III. I'd like details on system configuration, the communication links used for interserver messages, system performance, the number of installed systems and the future of this technology in light of upcoming clustering products.

Via the Internet

For Novell's SFT III, it is best to have identical hardware configurations on the paired servers. But with some extra effort, you can have differing amounts of memory in each server.

Fiber-optic copper or MSL media cards are used for the connection among servers. The fiber-optic MSL cards can be placed farther apart than the copper MSL cards. This is beneficial because, for the best protection, the servers should be located in different parts of a building.

For optimal performance, you may want a little more memory than you would normally have in a NetWare 4.X server.

You also need to make sure the NetWare Loadable Modules you want to use in this configuration are certified for operation on the SFT III platform because this environment is a little different from a single-server implementation.

In addition, when implementing SFT III, you should place print services on a stand-alone computer. This is because print services are somewhat server specific and won't automatically make the jump to the standby server when it becomes the primary system.

As for the number of SFT systems out in the field, you'll have to check with Novell.

I have installed three such systems, which should coexist with the clustering technology starting to appear.

Gigabit Ethernet standard takes shape

The IEEE 802.3z Gigabit Task Force works out the Fibre Channel-based 1000Base-X family of specifications.

By Howard Frazier

After more than a year of rigorous technical investigation and enthusiastic debate under the auspices of the IEEE, the Gigabit Ethernet standard is taking shape.

Significant progress has been made on the specifications for delivering Gigabit Ethernet over fiber-optic cabling. The first draft of the standard was presented to the IEEE 802.3z Gigabit Task Force and reviewed in detail in January.

Furthermore, just as the 100Base-T physical layers derived from FDDI are collectively referred to as 100Base-X, the task force decided that the Gigabit Ethernet physical layers derived from Fibre Channel should be collectively called 1000Base-X.

While the Fibre Channel standard provided a useful starting point, the task force realized two changes were needed to best meet the requirements of networking environments. First, with the short-wavelength laser transceivers that promise the lowest fiber-optic component cost. This distance is significantly less than the 550 meters called for in ISO 11801 for intrabuilding backbone runs.

Long-wavelength laser transceivers are installed throughout the telecommunications infrastructure to carry transmissions over long distances using single-mode fiber-optic cable. After a thorough investigation, the task force concluded that long-

UP CLOSE

GIGABIT ETHERNET GETS PHYSICAL

The IEEE 802.3z Gigabit Task Force is working on a series of specifications for delivering 1,000M bit/sec transmissions over fiber-optic cabling and one that addresses gigabit signaling over unshielded twisted-pair (UTP) cabling. Here's a look at those efforts:

Specification	Intended transmission facility	Purpose	Status
1000Base-LX	Long-wavelength laser transceivers	Will support links of up to 550 meters of multimode fiber or 3,000 meters of single-mode fiber for the delivery of 1,000M bit/sec	Drafted
1000Base-SX	Short-wavelength laser transceivers operating on multimode fiber	Will support links of up to 300 meters using 62.5-micron multimode fiber or links of up to 550 meters using 50-micron multimode fiber	Drafted
1000Base-CX	Short-haul copper jumpers (shielded twisted-pair cable that spans no more than 25 meters)	Will support Gigabit Ethernet links among devices located within a single room or equipment rack	Drafted
1000Base-T	UTP cabling	Will operate on up to 100 meters of four-pair Category 5 UTP cable	Under development

The review produced many comments and suggestions that will be incorporated into a second draft, which will be circulated shortly. At least one more major revision is expected before the task force submits the draft for a formal IEEE 802.3 Working Group letter ballot.

Looking to Fibre Channel

Early in the process, the task force decided to leverage the ANSI Fibre Channel standard and component technology so Gigabit Ethernet could be standardized and deployed quickly. This approach is similar to the one used for the IEEE 802.3u 100Base-T Fast Ethernet standard, which borrows heavily from the ANSI FDDI standard.

Gigabit Ethernet would have to provide a true 1,000M bit/sec data rate, just as Ethernet and Fast Ethernet provide 10M and 100M bit/sec data rates, respectively. Measured in the same way, Fibre Channel provides only 850M bit/sec.

Second, Gigabit Ethernet would have to support the international standard — ISO 11801 — for generic premises cabling. While these decisions may seem arcane, they had a tremendous impact on the specification.

Wired for the premises

Most fiber networks employ 62.5-micron multimode fiber. This fiber carries Gigabit Ethernet transmissions for only about 300 meters when illuminated wavelength laser transceivers could deliver a true 1,000M bit/sec over 550 meters of 62.5-micron multimode fiber. The resulting specification, referred to as 1000Base-LX in the draft, will support links of up to 550 meters of multimode fiber or 3,000 meters of single-mode fiber.

Recognizing the need for a lower cost solution in those situations where the link-distance requirements were more modest, the task force decided it also should generate a specification for short-wavelength laser transceivers operating on multimode fiber. This specification, called 1000Base-SX, will support links of up to 300 meters using 62.5-micron multimode fiber. In addition, 1000Base-SX will support links of up to 550 meters using 50-micron multimode fiber, which is popular in some countries.

To round out the 1000Base-X family, the task force is generating a specification for short-haul copper jumpers. This specification, known as 1000Base-CX, is intended for low-cost Gigabit Ethernet links among devices located within a single room or equipment rack. The jumpers, made from high-quality shielded twisted-pair cable, can be 25 meters long.

Gigabit Ethernet over UTP

At the January meeting, the task force decided to request authorization for a new project to address gigabit signaling over unshielded twisted-pair (UTP) cabling. The 1000Base-T physical layer will operate on up to 100 meters of four-pair Category 5 UTP cable as specified in ISO 11801. Four-pair Category 5 UTP is the cable most commonly employed in LAN cable plants, accounting for more than half of the installed base.

The 1000Base-T specification will take full advantage of recent advances in silicon processing and digital signal processing to apply sophisticated line coding and equalization algorithms to the chore of sending 1,000M bit/sec of data through a cable specified to only 100 MHz.

The IEEE 802.3z standard for Gigabit Ethernet is progressing on schedule and on target. The task force has met each milestone set for itself, and no obstacles are foreseen that would delay the completion of the standard in early 1998. The result will be a standard that will provide the basis for practical LANs running at 1,000M bit/sec, with seamless connectivity to the huge installed base of 10M and 100M bit/sec equipment.

Frazier is network architect for Cisco Systems, Inc.'s Gigabit Switch Group in San Jose, Calif., and chairman of the IEEE's 802.3z committee. He can be reached via the

EDITORIAL *insights*

Sounds good, but will it really work?

In the coming months, you'll hear more about new business-oriented Internet and intranet services from carriers who want to snag your WAN business.

The Internet is no longer a monolith (it never really was, except as a kind of media entity), but is emerging as a diverse set of offerings ranging from unlimited "best-of-luck!" $20-a-month access to sophisticated services designed for electronic commerce or secure communications.

A key aspect of those high-end services will be guarantees aimed at reassuring you that you're getting the extra performance you are paying for. As Mike Rothman, vice president of Global Networking Strategies at META Group, explains, "The first step is the ability to guarantee network availability, throughput and latency. Over time, carriers will add security and authentication, along with the ability to prioritize traffic by application."

Internet service providers such as ANS and UUNET have already announced performance guarantees, and MCI and others will be rolling them out soon.

But there's one big catch: How are you going to monitor the carriers to make sure you're getting all that extra service?

Carriers have done only a fair job of providing corporate customers with any real view into the network cloud or any tools to manage WAN links. When it comes to Internet/intranet services, the carriers are not likely to get much better.

For example, at a briefing last week, MCI talked about quality-of-service guarantees for Internet service. But when pressed on tools for monitoring service-level agreements, MCI said it was just beginning to craft a strategy.

Enabling customers to monitor Internet service may not be realistic, explains Tom Nolle, president of the CIMI Corp. consultancy. "It would be exceptionally difficult, if not impossible, to create a meaningful picture of the performance of a carrier intranet service. The interoperation of routers in a TCP/IP network impacts performance, and no carrier is going to be wild about making a service guarantee on something it can't control."

So, before you shell out cash for a guaranteed Internet service, find out whether you'll be able to monitor the carrier's performance yourself. Will you get any real-time problem alerts or any insights into impending problems? And you'd better check, warns Rosemary Cochran with Vertical Systems Group, whether you'll have to pay even more for equipment to monitor your links.

Guaranteed performance is a great idea — if you really know what you are getting.

John Gallant, editor in chief jgallant@nww.com

Totally Unplugged • Ira Brodsky

The next wave in wireless: Selling bulk airtime

At a trade show in Cannes, France, last month, European technocrats began a smug celebration. Years of devotion to planning, standards and protectionism has finally paid off: Europe is now the global leader in wireless communications.

Or is it? Having agreed to not disagree, Europe's telecom giants cheerfully donned blinders and are now firmly ensconced on top of what may prove to be an anthill. While old-world dignitaries congratulated one another on achieving an underwhelming 0.5% penetration of the world market, the U.S. wireless industry prepared to scale a real mountain: The mass market.

The U.S. telecommunications industry is about to undergo a major structural transformation. The impetus for this change is the U.S. personal communications services (PCS) market. Carriers have spent billions of dollars to acquire PCS licenses. Manufacturers are lining up to offer vendor-financed PCS infrastructure, and billions more will be spent on PCS marketing.

Rest assured, this is not your father's car phone. We are about to witness the general untethering of basic telephone services.

One company is betting the new order will demand a new approach. As the third largest PCS licensee in terms of points of presence (population covered), NextWave Telecom, Inc. has fashioned a unique "carriers' carrier" strategy. In essence, NextWave plans to mass-produce airtime and sell it wholesale.

Consider these facts: While the cellular telephone market penetration now exceeds 17% of the U.S. population, it represents only 1% of total telecommunications minutes of use. In recent years, cellular carriers have loaded up their networks with low-volume users — primarily consumers subscribing for personal safety and weekend use. NextWave, in contrast, will measure its success not by the number of phones registered on its network, but by how much people actually use them.

National PCS networks will be a boon to end users. With licenses in 40 of the top 50 U.S. cities, NextWave will be less dependent on intercarrier agreements for wide-area service. Like AT&T Wireless Services, Inc. and Sprint PCS, NextWave is likely to eliminate those outrageous roaming charges that plague cellular telephone users.

NextWave's wholesale strategy introduces a new level of efficiency to wireless markets. While other entrants will be forced to spend billions of dollars on marketing, NextWave plans to sell bulk airtime to companies with established brand recognition and retail presence. The savings should translate to lower prices for users — probably less than a dime per minute for local calls.

Until now, wireless operators have been obsessed with the voice market. With a business model based on minutes of use, and nets employing high-capacity Code Division Multiple Access technology, NextWave could be the first wireless operator to really push Internet access.

NextWave is also gearing up for competition in local phone markets. While AT&T and Sprint hope to use PCS as a means to bypass local exchange carriers, the vendors are doing so purely to boost their own long-distance businesses. Only NextWave plans to sell bulk airtime to all comers. As a result, users may one day receive discounts for buying their telephone, gas and electric service from a single utility.

Today, nearly 40 million Americans put up with analog cellular telephone service that is noisy, unreliable and expensive. NextWave believes digital PCS will deliver better performance at a lower cost — causing wireless usage to skyrocket.

Sure, NextWave is a high-risk venture in a high-stakes game. But by the same token, Europe's victory celebration may have been premature.

If NextWave builds its airtime factories, it'll be a whole new wireless horse race.

Brodsky is president of Datacomm Research Co., a Wilmette, Ill., consulting firm. He can be reached via the Internet at ibrodsky@ix.netcom.com.

MESSAGE QUEUE

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

Virus tales

Mark Gibbs asked readers to share their macro virus horror stories (March 10, page 65).

In my organization, we run multiple file servers, and I personally have found two different Microsoft Word macro viruses.

The first was the Concept virus, which is a known bug that writes a macro causing FileSaveAs to save documents only as templates. I was able to get software from www.microsoft.com that detected and cleaned up that virus, which fortunately had affected only one end user.

The second was the "This one's for you Bosco" virus. As far as I know, this is

Intranets offer chance for real change in SNA nets

A disturbing trend has developed among SNA users who are considering TCP/IP-centric intranet solutions as the basis for their next-generation corporate networks.

Rather than taking a systematic top-down approach, starting with the applications in use and working down toward the networking infrastructure required to support these and future applications, some enterprises are focusing entirely on the TCP/IP-centric intranet architecture with little regard for the legacy applications that still need to be sustained.

Once these users have determined the structure and composition of the intranet that theoretically meets the needs of their new applications, they then try to force-fit the SNA/APPN requirements into the intranet architecture — more or less as an afterthought. Instead of envisaging a tightly integrated, SNA-capable intranet that innovatively utilizes some of the new SNA Web technology, such as browser-based access, enterprises are resorting to separate circuits for the SNA traffic or using Data Link Switching (DLSw) to graft the existing SNA network onto the intranet.

The rationale for not devoting too much attention to SNA vis-à-vis the new intranet is obvious. SNA is now legacy and passé and, in time, will indubitably be surpassed by TCP/IP, even though the conversion may not happen for another five years or more. So the SNA requirements are deemed to be somewhat unimportant compared to the value of building high-bandwidth, multimedia-capable intranets with secure interfaces to the Internet. But this attitude is wrong and counterproductive.

Intranet-centric reengineering represents the first real opportunity most SNA shops have had in the past 10 years or more to streamline their SNA operation and replace obsolete equipment. Don't abdicate this golden opportunity to reconstitute your SNA infrastructure using all of the new, but proven, intranet-related technologies at your disposal. You can now realize cost-effective, secure SNA-capable intranets that fully support all existing mainframe and Application System/400-resident SNA applications and that are not based on parallel circuits or entirely on DLSw.

DLSw is one technique you can use to build SNA-capable intranets. However, it is an option you should consider only if you're stuck with having to support old, SNA-only devices such as a 3274 or compatible. If you are dealing with machines or devices that support TCP/IP as well as SNA, such as the AS/400, you should evaluate the possibility of cutting over to TCP/IP using tn5250, browser-based access and File Transfer Protocol, rather than maintaining existing SNA data flows through DLSw.

Likewise, there are options other than DLSw for transporting SNA traffic from a remote SNA LAN gateway across the TCP/IP intranet to the data center, consider other options. In most cases, you can eliminate the remote SNA LAN gateway and use tn3270, browser-based access or the 3270 datastream encapsulated in TCP/IP to transport data to the data center. This saves you money by eliminating the remote gateways and restricts the traffic flowing across the intranet to TCP/IP — as opposed to having SNA encapsulated within TCP/IP.

Even 3x74 control units present multiple options for reducing costs, upgrading terminals and updating the hostile 3270 user interfaces of most SNA applications. If you're using 3x74s purely as SNA LAN gateways or to support nonprogrammable 3270 terminal used only to access SNA applications, now is your chance to finally get rid of this 20-year-old technology.

Many enterprises persevere with old 3270 terminals because PCs, despite their ever-increasing affordability, are still just a tad too expensive. But now network computers and browser-based access provide a new and compelling option at a price comparable to that of a terminal, especially if one considers the maintenance costs.

Browser-based access currently is hindered by lack of comprehensive printer support. However, solid printer support should be available from multiple vendors this summer.

While DLSw, browser-based access, and tn3270- and tn5250-based SNA access are the most productive and relevant techniques for achieving SNA-capable intranets, other options are available, as well. These include IBM's AnyNet protocol conversion software, which converts SNA data to TCP/IP, and Desktop DLSw, which encapsulates 3270 and 5250 data in TCP/IP packets at the source. This is useful for certain mobile user applications.

Intranet-centric network reengineering is the best opportunity we have had in more than a decade to throw out the old and bring in the new when it comes to SNA networking. Don't waste it. Evaluate all of the new and exciting technology at your disposal, rather than just forging ahead with parallel circuits or DLSw.

Gurugé is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via the Internet at aguruge@mcimail.com.

MARTY BRAUN

not a documented virus, and no software I used could detect it. Like Concept, this virus also wrote a macro that caused FileSaveAs to save only templates, but it also presented a dialog box stating "This one's for you Bosco." However, this virus was a little sneakier than Concept, because the macro could not be edited, so I could not see what was actually happening.

To solve this, we had to open all infected documents, delete the macro, save the document, then close and save the normal template. Pretty time-consuming, but it worked. This macro did populate to multiple people sharing some files.

Pam Squires
Information center specialist
Marshfield Medical Research & Education Foundation
Marshfield, Wis.

It is not surprising that an off-the-shelf virus detection program would fail to find a virus. The vendor is sure to keep the downloadable version of the product current. But how is an off-the-shelf copy going to stay current?

If I had my way, when you purchase a virus detection program, all you would get would be a manual and key code or a license file. You would then go download the product and register at the same time. That way, you would know you are always getting the current code.

David Michel
Senior technical support analyst
Cheyenne, a division of Computer Associates International, Inc.
Carlsbad, Calif.

I work for a Fortune 100 company and received an E-mail that contained the MDMA virus. I had an old version of McAfee's VirusScan (DAT files) that never picked up the virus. However, after I installed the newer DAT files, I was surprised by McAfee's behavior.

While McAfee detects viruses in DOC and DOT files, it does not seem to detect viruses in E-mail MIME attachments. Until you reopen a message, McAfee remains silent. Even upon notification of a virus, McAfee does not clean up the original E-mail attachment.

Anyway, I downloaded Microsoft's SCANPROT.DOT, which cleared up the peculiar error messages I was receiving.

Evidently, Dr. Solomon's Anti-Virus Toolkit, which Gibbs mentioned, also does the job correctly.

Michael Nistler
Petaluma, Calif.

My organization has been hit by the Concept and Wazzu macro viruses.

When our original version of Norton AntiVirus for Windows 95 didn't find them, we downloaded an upgrade to the software from Norton's Web site. This, combined with the latest virus definition files posted monthly, allowed us to find and eliminate all occurrences.

All of this was free and easy to use.

Michael Kleiner
Technical administrator
Haushahn Systems & Engineers
Grand Rapids, Mich.

Teletoons

Phil Frank and Joe Troise baba@sfgate.com

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Custom Intranet Application Models

Chair, Michael Howard, *Infonetics Research Inc.*

Tuesday, May 6 • 10:15 am–11:45 am

How can you evolve your intranet from simple publishing to full application development platforms with either Netscape ONE or Microsoft Active Platform? Learn to dramatically reduce the costs of developing, deploying and maintaining applications based on open standards including HTML, JavaScript, VB Script, Java and ActiveX.

Remote Access—Extending the Network to the Edge

Chair, Val Sribar, *Meta Group Inc.*

Tuesday, May 6 • 4:00 pm–5:30 pm

Need to unify diverse applications and traffic types at remote network locations over a single access facility into the WAN? The intelligent remote access device which supports router-based LAN traffic, Video, POTS or data over ISDN, Frame Relay or ATM is emerging as a cost efficient way to provide integrated carrier services. Examine the issues and possibilities.

Evolution of Broadband Access Technologies and Systems

Chair, Dr. David A. Kettler, *BellSouth Communications*

Wednesday, May 7 • 1:30 pm–6:00 pm—Double Session

Consider challenges associated with various shared-media architectural alternatives for delivering advanced broadband multimedia services to residential and business subscribers. Wade through the maze of residential broadband access options with this panel of world-class experts representing independent research/academic institutions, MSO/LEC equipment vendors and service providers.

Competitive Access Providers—The MAN Alternative

Chair, Gerald Ryan, *Connections Telecommunications Inc.*

Thursday, May 8 • 10:15 am–11:45 am

CAPs are positioning themselves to offer cost effective services well beyond the provisioning of bypass access to interexchange carriers. Discover CAPs' key advantages. Examine the technical issues, the pros and cons of their services, cost tradeoffs and implementation concerns.

1-Day Workshops

Internet and Intranet Security Design and Management

Marcus Ranum, *V-ONE Corporation*

Wednesday, May 7 • 9:00 am–5:00 pm

Don't unwittingly accept substantial security risks! Firewalls help, but must be combined with good site security practices. Get a technical overview of security design and maintenance techniques to protect your business in the highly networked future. Discuss risk assessment, security policies and procedures, security solution design and selection, auditing and incident response.

IPv6 Transition Planning

Robert E. Gilligan, *FreeGate Corporation*

Thursday, May 8 • 9:00 am–5:00 pm

Faced with integrating IPv6 products into your existing IP network? Explore the special mechanisms that have been designed into IPv6 to simplify transition and look at the various transition alternatives available to small and large Internet and intranet sites. Specific transition plans will be shared that can be customized to individual requirements.

2-Day Tutorials

Everything You Need to Know About Internet Protocols to Enhance Network Performance

Dr. David Clark, *MIT*

Monday–Tuesday, May 5–6 • 9:00 am–5:00 pm

Look specifically at Internet protocols such as TCP to get a clear, simple introduction to core network performance issues and an in-depth look at critical topics including congestion control, performance tuning and diagnosis, specification of performance and very large network issues. Enjoy a non-mathematical approach relevant to your real-world problems.

Hot Topics in Networking: ATM, High-speed LANs, Multimedia, Wireless, IPng and ABB

Dr. Raj Jain, *Ohio State University*

Monday–Tuesday, May 5–6 • 9:00 am–5:00 pm

Discuss trends and consider hotly debated new developments and technical issues such as multimedia, wireless LANs and WANs, IPng, and residential broadband. This tutorial is designed as a technical overview of recent advances in networking for attendees who do not have time to take individual tutorials on each topic.

ATM and IP: Theory and Practice

Dr. Douglas E. Comer, *Purdue University*
Dr. Paul V. Mockapetris, *Software.Com*

Thursday–Friday, May 8–9 • 9:00 am–5:00 pm

Survey the two most promising networking technologies for the next decade, learn their strengths and weaknesses, and explore ways IP and ATM can be integrated. The course examines the likely future as IP evolves to version 6, as more of the ATM promise is realized, and as alternatives such as Fast Ethernet and direct access to SONET evolve.

Internet Multicast and Multimedia Technologies: The MBone, RTP and RSVP

Dr. Steve Deering, *Cisco Systems*
Dr. Deborah Estrin, *USC*
Dr. Lixia Zhang, *UCLA*

Thursday–Friday, May 8–9 • 9:00 am–5:00 pm

Discuss the creation, operation and application of the MBone and the underlying protocol technologies which have further evolved due to the MBone's rapid growth. Examine the future of Internet architecture and protocols including the forthcoming resource reservation protocol, RSVP, the proposed multicast routing protocol, PIM, and a new, highly scalable protocol for reliable multicast, SRM.

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Feature

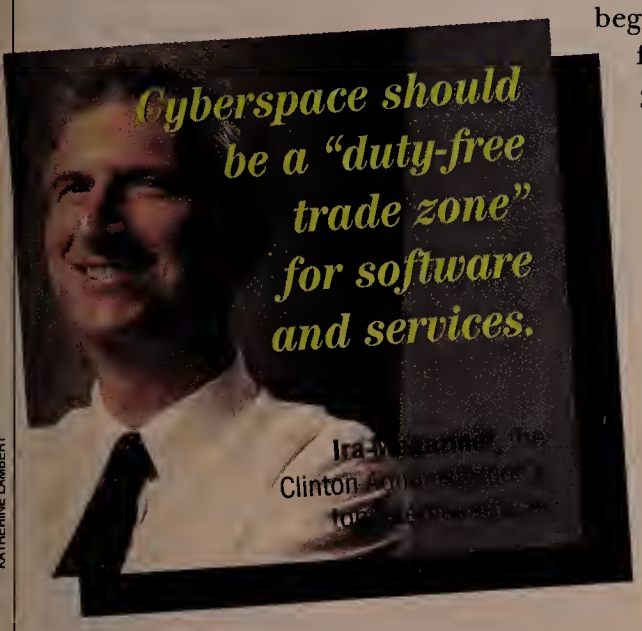
A CALL TO ACTION

Continued from page 1

Taxation is one area where the federal government must step forward and take command to create a fertile environment in which electronic commerce can take root.

Questions abound as to what exactly to tax. Should states levy fees on users who access the Internet? How will electronic commerce transactions be taxed? What about taxing Internet service providers for using local telephone exchanges the same way rates for long-distance providers are levied? Should the government install the tax equivalent of tollbooths on the info highway?

The Clinton administration's top Internet adviser, Ira Magaziner, suggests in a white paper published in December that cyberspace should be a "duty-free trade zone" for software and services sold across the 'Net. Other goods would be taxed the same way telephone or catalog orders are processed today. He also advocates that new taxes shouldn't be devised for the 'Net; only existing tax structures should be modified to fit the environment.



"That would be a very important policy which would stabilize and stimulate the online marketplace," says Jim Johnson, deputy director for the global information infrastructure commission at the Center for Strategic & Information Studies (CSIS), a Washington, D.C. think tank. Johnson heads the U.S. delegation to the G-7 Summit working group on electronic commerce.

Robert Butler, a lawyer with Wylie Rein Fielding, a Washington, D.C. law firm that represents carriers and ISPs, says the federal government also needs to assert uniformity on the Internet tax issue in order to "preempt state initiatives that could cost Internet service providers unwieldy sums if they are exposed to different tax rules on a multistate basis."

Sen. Ron Wyden (D-Ore.) and Rep. Chris Cox (R-Calif.) just introduced the Internet Tax Freedom Act in mid-March, a pro-ISP measure that would preempt state taxation policy by imposing a moratorium on state and local taxes of Internet transactions.

While it's advantageous for federal officials to join an Internet tax discussion, CSIS' Johnson says it's a "fairly ticklish political issue to tell the states what to do on tax policy." To their credit, Johnson says, governmental officials have begun working with state task forces and private banking groups to set up coalitions to explore taxation issues related to Internet transactions. "This is not a good area for federal preemption; it's a better idea to cooperate with the states to get faster results," Johnson says.

John Curran, chief technology officer at BBN Communications, Inc., an ISP in Cambridge, Mass., cites another reason federal involvement in the taxation issue may be unnecessary. "States that pass rules that are Internet unfriendly will quickly find less Internet use, so I think this is self-correcting," he says.

Doug Starkey, a vice president in NationsBank Corp.'s Strategic Technology Group, simply wants federal officials to move quickly. "What we need is a defined policy," Starkey says, pointing out that banks are anxious to position new online payment systems and, thus, need their tax questions answered.

NationsBank, he says, is encouraged by government involvement in pilot programs such as E-Check, an online payment system between banks and the Federal Reserve to process the online equivalent of personal and business checks.

There are other reasons to move quickly on the taxation issue. Buddy Fiume, senior director of network services at Nabisco, Inc. in Parsippany, N.J., says his company is considering driving electronic data interchange data across the Internet because it would cost about 1/20th the price of private network offerings. But if the government imposes duties on Internet transactions or on ISPs to pay for access to local exchange carrier (LEC) facilities, the extra pass-along costs could obviate the benefits.

From all accounts, it appears the best move for the federal government is to step in as a business facilitator. Rather than dictating tax policy, the fed should help states work with the private sector to craft a policy each can live with. Magaziner's proposal of a "tax-free policy zone" is encouraging and certainly would allow 'Net start-ups to take root by encouraging buyers to shop online. And the feds should heed user requests to, for a change, act quickly. Businesses need to determine the economic viability of the Internet without fear that new tax policies will later change the equation or dilute the effectiveness of their efforts.

TAXATION

Role	Action Items
Regulator	Declare the Internet a tax-free zone for the sale of software and services.
	Act quickly, to relieve uncertainty.
Facilitator	Coordinate efforts of states and industry to define equitable taxation policies.

Intellectual property debate

Another tangled policy the government has to contend with is intellectual property issues. Here, the feds are faced with setting policy for trademark infringement and copyright protection as they relate to the 'Net. "There's a role for the federal government to play with intellectual property, and unfortunately, they are not doing a very good job yet to encourage a positive set of licensing practices," says Lori Fena, executive director of the Electronic Frontier Foundation in San Francisco.

Fena says some legislative proposals have suggested that any time a software product is copied to a hard disk, it should be recognized as a revenue transaction — even temporary files written to disk would be considered a new transaction, she says. "That type of thinking is just insane," Fena adds.

It also underscores the naivete of legislators, many of whom stumble in efforts to create effective legislation because they

ILLUSTRATIONS BY ANTHONY FREDA

KATHERINE LAMBERT

don't have sufficient understanding of Internet technology and issues (see story, this page).

Some organizations, such as the Information Technology Industry Council (ITIC), which represents the interests of computer and communications providers, are hopeful legislators will offer protections but "not put in barriers that would kill new services," says Fiona Branton, director of the government relations and regulatory counsel at the ITIC.

One concern ITIC members and business users share is protection of databases. At present, misuse of databases is not covered under copyright protection laws. That would change under the "Framework for Global Electronic Commerce," the Internet policy paper drafted by Magaziner. He suggests any federal intellectual property policy tied to the Internet should "guarantee copyright protection for computer programs as literary works," ensure protection for databases and map out provisions for fair usage of those resources.

The paper goes on to call for the federal government to work closely with the World Intellectual Property Organization to hammer out Internet-related treaties extending to copyrights, patents and trademarks of materials that flow across the Internet.

David Sims, technical manager of information technology at Schlumberger, Ltd. in Sugar Land, Texas, likes that approach. "Copyright and trademark issues are what legislation was made for," Sims says. "On the other hand, I don't think the government should ram it down people's throats."

INTELLECTUAL PROPERTY

Role	Action Items
Regulator	Bring databases under the protection of copyright laws.
Facilitator	Help define policies for trademark and copyright protection.
Cheerleader	Lobby other nations to adopt uniform policies.

The upshot is the federal government, at the very least, should extend copyright protection to corporate databases that are available online, in order to ease fears that intellectual property will be stolen if made available via the World-Wide Web. Further, as with the taxation issue, it needs to ease corporate concerns by moving swiftly to adopt intellectual property policies. Failing to do so may well jeopardize the entire electronic commerce industry, or at least cripple it at a time when so many companies are sinking large sums of capital into their online endeavors.

Encryption woes

Intellectual property policy is entwined with another sticky Internet issue: encryption. In fact, as Sims says, the federal encryption policy "makes it difficult to protect intellectual property."

For instance, he points to software products that may be patented in one country but not the next. As you pass software across borders, encryption becomes the means to guard against patent infringement.

However, Sims says, encryption policy is "all over the map" not only in the U.S., but abroad. The U.S. should step forward and take the lead in defining a uniform policy worldwide, he says.

At present, the most powerful encryption tools the U.S. allows businesses to export are those based on 56-bit key-recovery technology, which involves private keys used by two parties to encode and decode messages. More powerful tools are not allowed because the feds fear they could be used by criminals and terrorists to mask their communications, inhibiting the ability of law enforcement agencies to adequately monitor their activity.

Security experts are unanimous in their view that 56-bit encryption is woefully inadequate in today's digital world. But under Magaziner's proposed framework, 56-bit encryption controls would continue for at least the next two years.

On the other hand, Magaziner calls for the federal government — including the departments of Commerce, Defense, Justice, State and Treasury, as well as the Office of the President — to work with the Organization of Economic Cooperation and Development (OECD) and the European Union to develop common Internet policies for encryption and security to encourage electronic commerce. OECD encryption guidelines are expected to be complete by year-end.

ENCRYPTION

Role	Action Items
Regulator	Ease export controls on 56-bit encryption tools.
Facilitator	Build ties with private-sector players to reach encryption consensus.
	Foster growth of trusted entities that hold the keys for private companies.

Meanwhile, the Clinton administration has shifted jurisdiction for commercial encryption controls from the State Department to the Commerce Department. That move, experts say, may be the first step toward reshaping encryption policy because the Commerce Department would be more sympathetic to business needs.

Some members of congress likewise recognize the need to reform encryption policy. Sens. Conrad Burns (R-Mont.) and Patrick Leahy (D-Vt.) reintroduced in February the Promotion of Commerce Online in the Digital Era Act. Originally introduced last year, the bill never saw a full Senate vote but picked up the support of about 20 prominent backers. The proposed legislation would relax controls on the export of encryption software. It would also prohibit the federal government from imposing mandatory key-escrow or key-recovery encryption policies on the domestic market.

As policy wonks throw around encryption ideas, businesses contend with the effects of existing policies. For instance, NationsBank's Starkey says the bank must verify residency of domestic customers who want to use the 128-bit browser that front-ends the bank's Web banking system. Verifying residency requirements online is difficult, Starkey says, and the bank must exclude those customers whose addresses can't be verified. The bank also would like to pass the software to overseas customers, but current regulations forbid it.

"I think they should take a look at what is logically possible today with 128-bit browsers and realize that a policy of not allowing it to be exported is not logical," Starkey says. He concedes law enforcement agencies have some valid concerns, "but they also have enough horsepower to break any sort of keys out there in a reasonable amount of time."

According to Sims, the government should recast encryption policy. He says current policy does not motivate software firms to develop hooks for their applications to tie in to encryption products. "They're afraid someone will bundle their products with encryption tools and embroil them in this whole mess," he says. The net result is customers don't get the integration they need.

It's time for the government to do a reality check on the encryption issue. As CSIS' Johnson says, "The rest of the world is getting better encryption than we have. All we're doing is creating an island that isolates U.S. interests."

Domestically, legislators should strip away any encryption limits and allow U.S. businesses to protect their data using key encryption. Moreover, the feds should loosen export controls — perhaps allow 128-bit encryption technology as a start — and create incentives for new businesses to spring up and act as trusted entities that hold encryption keys for private businesses. Some large businesses should be entitled to hold their own keys; certainly a major corporation would want to control its own encryption to guard against internal security breaches or even corporate espionage.

Ideally, federal agencies such as the Federal Bureau of Investigation and the National Security Agency should build partnerships with U.S. businesses to hammer out mutual agreements. The business community has as much concern over the safety of data as federal agencies.

Act of decency

So long as the Communications Decency Act (CDA) is around, encryption isn't the only federal policy that needs a face-lift.

While some conservative groups say there's a role for government to play as a censor and monitor of content that rides over the Internet, constitutional rights groups say proposed legislation goes too far and undercuts rights to free speech.

CENSORSHIP

Role	Action Items
Regulator	Pass legislation that puts the burden of content control on end points, not carriers.
Cheerleader	Encourage development of content-filtering tools.

The CDA, introduced by Sen. Jim Exon (D-Neb.), has been derailed awaiting a ruling on its constitutionality by the U.S. Supreme Court. The court heard oral arguments on the case just over a week ago and is expected to rule in late June or early July.

The CDA imposes fines of as much as $100,000 or up to two years in prison on anyone who "knowingly ... makes or makes available any indecent communications ... to any person under 18 years of age."

According to the Center for Democracy and Technology, a Washington, D.C. group that advocates free speech, the restriction on indecency amounts to a total ban on all indecent information in public areas of the Internet, since all users of the 'Net know that public areas are accessible to minors. The Supreme Court has held over and over again that indecent material is protected by the First Amendment and may only be regulated with narrowly tailored means that leave adults free to communicate.

If online content is objectionable, legislation should aim to stem it at the end points, not in the pipe, says Don Heath, president of the Internet Society (ISOC). "Introducing technology or some other means into the Internet to censor is wrong," he says.

Nabisco's Fiume says company management is concerned about content flowing from the Internet to workers' desktops that "contains messages from competitors or happens to be offensive." While the issue may affect employee productivity, he says the remedy is to apply filters that keep unwanted information from flowing in.

"That's not the government's job, it's ours," Fiume says. "But I do believe the government should encourage and incent businesses to create the type of products we need to filter unwanted information," he adds.

Good idea. The government can act as a cheerleader, promoting private-sector development of new tools that can be used to manage Internet content and screen objectionable material. That would obviate the need for censorship, enabling users to control content themselves.

At the very least, legislators need to rethink key provisions of the CDA, including elements that would force online providers to assume the role of content censors. Clearly, any legislation on content provisions relating to Internet traffic should not tap ISPs to enforce censorship policy or take on the additional burden of policing traffic that rides across their respective networks. Long-distance carriers and LECs have never been saddled with that job; there's no reason ISPs or other online providers should be.

We've assembled a wealth of links to sites offering more information on various Internet policy issues, including:

- **The Internet International Ad Hoc Committee, which is addressing domain name issues.**
- **The Internet Caucus, Rep. Rick White's forum for educating his colleagues on 'Net-related issues.**
- **The Electronic Frontier Foundation, which has information on privacy, encryption and intellectual property news.**
- **The Encryption Policy Resource Page.**
- **The CyberLaw Encyclopedia, which points to a number of position papers regarding the regulation of online services, free speech on the 'Net and other issues.**
- **A Treasury Department paper on federal income tax policy and administration issues related to the Internet and electronic commerce.**
- **White House chief Internet adviser Ira Magaziner's policy framework for electronic commerce.**
- **The Center for Democracy and Technology, which maintains info on the Communications Decency Act and other proposed Internet-related legislation.**

www.nwfusion.com

Masters of regulation

There is even more potential for the government to play an active regulatory role when it comes to ensuring quality of service from ISPs and common carriers that

provide Internet bandwidth.

However, in an era when the Internet is big business — fueling demand for everything from semiconductors to WebTV terminals — the Federal Communications Commission under the Clinton administration is inclined to let competition rule.

"To the extent the industry is able to develop measures and act on its own, there is no need for the commission to step in and mandate things," says Kevin Werbach, counsel for new technology policy at the FCC. "Our goal is to develop competition to a point where we don't need to be involved."

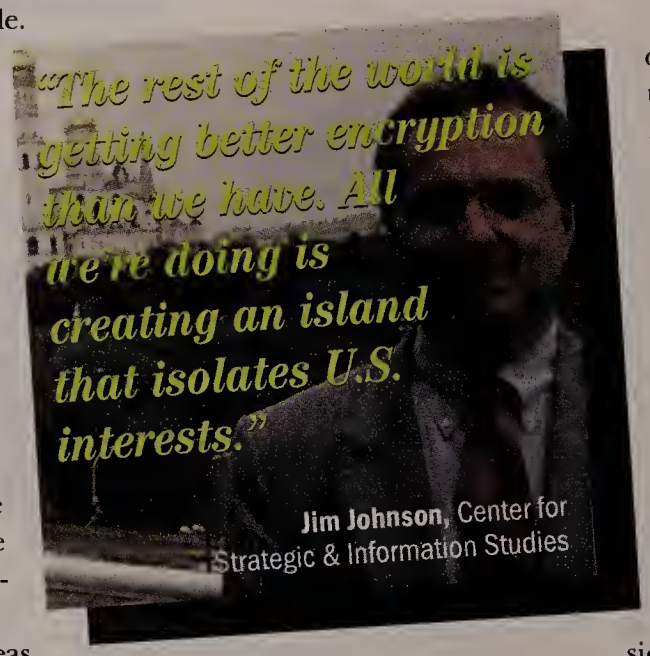
FCC Chairman Reed Hundt has staked out two major goals: Promote expansion of bandwidth for the 'Net and cultivate universal access for all Americans. In order to achieve these goals, the FCC believes it must ensure the market is operating freely and competitively.

"The question for us is identifying areas where that's not the case and why, and understanding if that's because our rules are restricting development or if there are other steps we must take," Werbach says.

But there may well be areas where the FCC will need to inject itself for the benefit of businesses that use the Internet.

Consider the plight of NationsBank. Starkey says prior to the popularization of the Internet, the bank could get a high-speed data line from LECs within three to four months. "Now they're asking for a lead time of 13 to 15 months for a DS-3," he says, largely due to a scarcity of bandwidth the carriers blame on growing Internet traffic.

The lack of bandwidth in the local loops demonstrates that the government should move swiftly to provide incentives for fiber investments and institute other policy directives to step up competition. In California, for instance, an initiative by the public utilities commission gives Pacific Telesis Group a 15-year rate increase with the understanding the carrier will invest almost $14 billion in fiber upgrades during that period.



On the other hand, subsidies should be doled out judiciously, observers say. Some LECs argue that Internet access traffic is congesting their nets, and they ask for government subsidies so they can trot out new high-speed digital services to alleviate local traffic woes.

"Local carriers have dragged their heels because they're looking for yet another subsidy from the government," says Dave Thomas, an associate at Washington, D.C. law firm Cole, Raywid & Braverman. "They've grown accustomed to handouts." Thomas believes agencies such as the FCC need to view any arguments made by lobbyists and other special interest groups with "the detachment and critical eye of a good judge."

If existing carriers can't provide bandwidth in a timely manner, the introduction of competition should help by giving business users the alternative bandwidth choices they need to knock down those 13- to 15-month lead times. Moreover, such competition would give LECs all the incentive they need to reinvest in the local loop and provide higher speed services.

"The FCC needs to foster an environment where everyone has an equal chance [for financial aid or other incentives], but no one has a guarantee," Thomas says. He says the LECs are lobbying for pricing freedom now, which would give them a guarantee of success in local markets well before alternative carriers have an opportunity to establish a foothold.

There's also the question of reliability to consider. The FCC recoils from the suggestion that it should step in as the overseer of network quality issues. Werbach points to the telephony industry's Network Reliability Council (NRC) as a cooperative forum for service providers to sort out reliability issues. His hope is that ISPs will band together in a similar fashion.

That's a good idea, but the FCC should do more than hope. It should step up and take on the role of facilitator in setting up an industry forum that addresses Internet services. The commission should encourage carriers to address issues such as 'Net congestion and push for deployment of standards such as the Resource Reservation Protocol — two initiatives that will lay a sound foundation for electronic commerce.

Similarly, the government should do more to guarantee local competition. Incentives to build out fiber facilities are much needed. But such incentives should be tied solely to capital investments and not to concessions carriers seek.

We also agree with the FCC that Internet access rates for ISPs should remain unchanged for now. There is no conclusive evidence that Internet traffic alone congests local loops, and even if it did, that's a capacity planning issue carriers need to consider.

CARRIERS AND ISPs

Role	Action Items
Regulator	Don't increase access rates ISPs pay to local exchange carriers.
Facilitator	Provide investment-based incentives for carriers to build out fiber facilities.
	Help IPSs form industry forum to address reliability and other issues.

Sponsor once more

While the FCC hopes to stand back and allow market forces to guide the Internet, other factions of the federal government realize the urgency to maintain a sponsorship role to help guide the market.

Within the past two years, the National Science Foundation (NSF) has handed off the lion's share of the operational duties it has taken on since the Internet's inception. Now NSF officials are gearing up for a renewed sponsorship drive, a multifaceted effort with tentacles that reach deep into universities, private industry and government agencies.

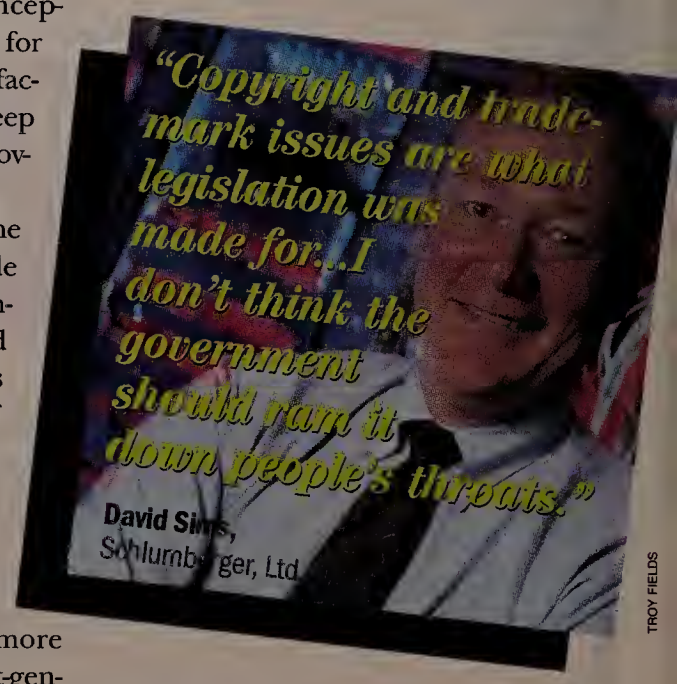
"There's plenty of opportunity for the traditional government partnering role to accelerate development of the technology through research, test beds and first users of new technology," says George Strawn, division director of networking and communications research and infrastructure at NSF and chairman of the Federal Networking Council.

The NSF envisions at least three initiatives aimed at creating one or more networks that would make up the next-generation Internet. First, the existing very high-speed Broadband Network Service (vBNS) network, which was commissioned in 1985 to link university supercomputer centers, is being expanded to provide universities with connections to its OC-12 (622M bit/sec) backbone for research into next-generation Internet applications. At present, 30 universities connect to the vBNS, and Strawn says the NSF is well on its way to supporting 100 organizations.

The second initiative is Internet II, an 18-month-old effort by 98 universities to provide an environment for universities and the private sector to collaborate on advanced network applications development. At present, Internet II is only a program; there is no network. But there is talk of involving the private sector — such as carriers and ISPs — to subsidize development of a network that would be used strictly for research projects spawned from vBNS. Until that happens, researchers are using a portion of the vBNS.

Building Internet II in cooperation with private industry is "a great idea," Strawn says, but he adds it could raise acceptable-use policy (AUP) concerns. "We're sensitive to some of the issues the private sector has presented in the past about our AUP," he says. Internet II is starting out with the door closed to industry players, but that door could open if industry partners can agree to AUP principles and not "run to Capitol Hill with their concerns," Strawn adds.

The third NSF initiative is the Next-Generation Internet (NGI), a federal effort to spread the Internet across all government agencies. The idea is to create Internet sites and provide Internet applications support for the National Aeronautics and Space Administration, the National Institutes of Health, the Defense Department and other federal bodies — in effect, an Internet dedicated to federal agencies.



TROY FIELDS

NationsBank's Starkey supports the premise of Internet II. The idea of an Internet that has varying classes of service "would be appealing if you get more bandwidth and a lot less traffic on the network," he says. Such a parallel network might even take some of the congestion away from the

THE WHITE HOUSE WEIGHS IN ON INTERNET POLICY

Recommendations in a white paper by Ira Magaziner, White House Internet adviser

Taxation:
- Declare the Internet a duty-free zone — no taxes on products or services sold across the 'Net.
- Apply only existing tax regimes to electronic commerce.
- Negotiate international policy quickly before vested interests form to protect existing tariffs.

Intellectual property:
- Guarantee copyright protections for computer programs as literary works.
- Ensure protection of databases.
- Discourage use of devices that defeat anticopying systems.
- Establish international standards to determine the validity of patent claims.

Encryption:
- Continue 56-bit encryption restrictions for two years.
- Make domestic use of key recovery voluntary.
- Work with international bodies to develop guidelines for supporting key encryption.

Decency/Content:
- Develop a dialogue with key trading partners on content issues such as advertising, hate speech, fraud, violence and [illegible].
- Promote the use of industry self-regulation and rating systems.
- Promote development of content-filtering tools.

[illegible] MAGAZINER

existing infrastructure, according to Starkey.

The NSF's three-pronged plan has merit. Of all the arms of government interviewed for this story, NSF officials have by far the best grasp of the 'Net and its needs — no great surprise given its background. Perhaps more important, the NSF also has a vision for the future of the Internet. We'd like to see each of its three efforts come to fruition.

RESEARCH AND GROWTH

Role	Action items
Sponsor	Subsidize growth of the vBNS network for university supercomputing research.
	Partner with industry and schools to build Internet II for collaborative research.
	Back Next-Generation Internet initiative to bring Internet services to federal agencies.

But the NSF needs to tread carefully, too. Its sponsorship role should be limited to bringing new networks to life and, when appropriate, turning them over to private industry so new services can be used by the masses instead of just the nation's research communities.

And the vBNS network is largely a child of MCI Communications Corp., which provides the fiber and manages the network. As the NSF moves ahead with other initiatives, it will be important to allow a greater number of vendors and carriers to play together to bring networks such as Internet II and NGI to life. Giving control to a handful of carriers — each with its own next-generation network — could prove detrimental at the point when these research networks are turned over to the private sector.

Opportunity knocks

It's unfortunate that other sectors of the federal government aren't as well prepared as the NSF for the work that lies ahead. Important pieces of legislation that stand to shape the communications landscape for years to come for now rest in the hands of senators and congressional members who understand little about the Internet environment they will help shape.

There are opportunities to partner with state agencies, the private sector and user organizations. Some of the early success the banking industry has had with government participation in new electronic payment systems has come about because of these cooperative efforts.

We'd hope to see more of that activity. In fact, ISOC President Heath has pledged the Internet group's support in helping to orchestrate standards activities and provide a forum for Internet self-rule, where the federal government permits such activity.

Given that the U.S. government wields enormous clout with other nations, perhaps its most important role will be as a champion of Internet causes worldwide and a catalyst for global Internet policy change.

"Half of the hard work is pumping out the policy we need domestically; the other half of the job is for the government to sell those ideas to other nations," says CSIS' Johnson.

Schlumberger's Sims agrees. "There's a leadership role for the U.S. to take in being a catalyst to cooperate with other nations to drive uniform policy. That role alone will help companies better operate in a global market," he says.

And one thing is abundantly clear: Legislators and other policymakers have to get up-to-speed fast on these myriad issues. The need to make policy decisions quickly was the most common recurring theme in our research. Business decisions that can shape the future of electronic commerce hang in the balance. Government, not accustomed to being nimble, has to start keeping pace with Internet time. ■

NetworkWorld PC WORLD

SERVER TEST SERIES

A monthly feature in which we evaluate file and application servers based on tests conducted in a lab owned jointly with our sister publication, PC World.

Two servers, two different worlds

By William Rinko-Gay

This month's workgroup servers are two very different animals. The AST Research, Inc. Manhattan D6200 is a small and inexpensive server with a modest amount of expandability. Koutech Systems, Inc.'s Goliath 1100 Application Server is a large, expensive but very expandable beast.

The target markets of the two machines are drastically different. For a solidly engineered workgroup server that won't break your budget, you'll want to check out the D6200. For an application server that can grow with your business, the Goliath 1100 Application Server is a better bet. In fact, it's hard to tell whether the Goliath is a high-priced workgroup server or a low-cost enterprise server.

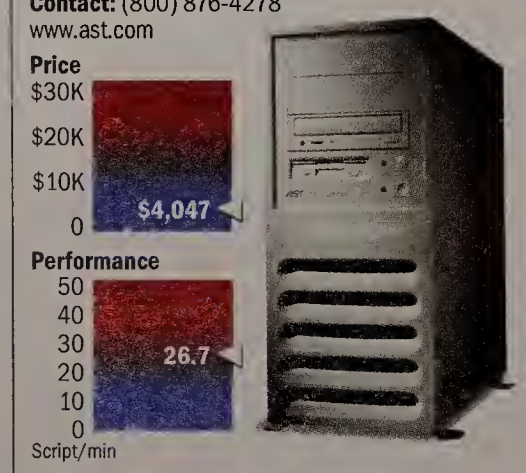
RATING LEADERS TO DATE

Workgroup servers	Issue tested	Performance rating	Overall score
Compaq ProLiant 800	1/13/97	**34.5**	**7.9**
HP NetServer LD Pro	1/13/97	**29.2**	**7.6**
Dell PowerEdge 2100/200	2/24/97	**30.2**	**7.2**
Koutech Goliath 1100 Application Server	This issue	**30.4**	**6.9**
AST Manhattan D6200	This issue	**26.7**	**6.8**

Because workgroup and enterprise tests are run differently and aren't weighted the same, the performance ratings and overall scores are not comparable.

Manhattan D6200

Vendor: AST Research, Inc.
Contact: (800) 876-4278
www.ast.com



Performance ratings are based on the results of file server, database and Web server tests at the 16-client level. Results are weighted according to the following percentages for each kind of test:
File server **35%**
Web server **35%**
Database **30%**

AST's Manhattan D6200 is similar to the Dell Computer Corp. PowerEdge 2100 workgroup server we reviewed last month, but with a smaller feature set and a lower price. For $4,047, you get a 200-MHz Pentium Pro processor, an integrated Fast Ethernet adapter based on Intel Corp.'s Ether-Express Pro chipset, an integrated Ultra-Wide SCSI adapter, and three PCI and three ISA expansion slots.

In this configuration, the Manhattan isn't a fast file server, although adding one or two drives would have increased its speed. Application performance was good, but file server performance lagged. You should consider a configuration with additional drives to improve file server performance.

AST **Manhattan D6200**

OVERALL SCORE	6.8
Performance **(40%)**	6
Features and flexibility **(40%)**	7
Management apps/features **(10%)**	8
Serviceability **(10%)**	8

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

The Manhattan D6200 is a minitower unit with plain styling. There is a power switch, a reset switch, and power and drive LEDs on the front. Inside, the system is clean, with only the drive cables to get in your way and a nice cable collector to help resolve that problem. Removing three screws allows you to slide a side panel off and reveal the entire interior. A configuration label is attached to the bottom of the unit.

The internal drives are mounted at the rear of the computer to make the most of the internal space. The drive cage slides out after the removal of three additional screws, and each drive is mounted to the cage with still more screws. (At this point, you might prefer toolless drive mounts.) Adding external devices requires taking the other side cover off.

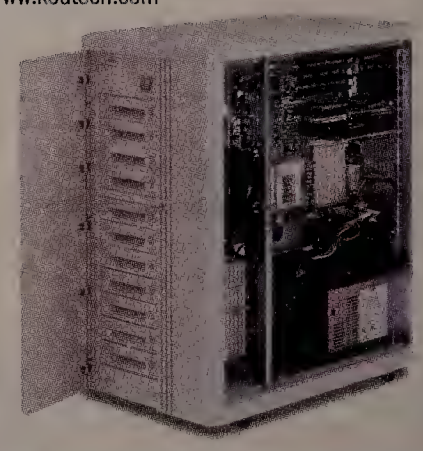
The unit is reasonably expandable, with five internal and two external drive bays available.

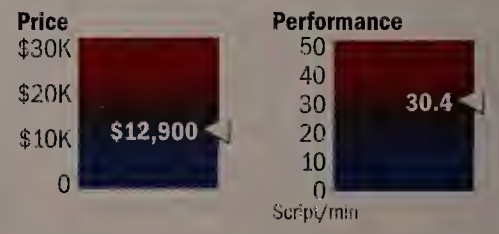
AST provides Intel's LANDesk for management but doesn't include LANDesk Pro's serial card, which can be used to manage your server even if it can't be reached by the network.

Printed documentation is adequate. The bootable utilities CD-ROM contains a driver diskette creation utility and a set of Adobe Systems, Inc. Portable Document Format documentation. If you want to use the Manhattan as an intranet server, you can purchase AST's Internet software bundle, which includes a Web server, File Transfer Protocol server, news server, mail server, chat and more, all preinstalled and ready to run with Windows NT Server 4.0 on a 4G-byte drive.

Goliath 1100 Application Server

Vendor: Koutech Systems, Inc.
Contact: (562) 699-5340
www.koutech.com





Performance ratings are based on the results of file server, database and Web server tests at the 16-client level. Results are weighted according to the following percentages for each kind of test:
File server **35%**
Web server **35%**
Database **30%**

Koutech Systems' Goliath 1100 Application Server fits neatly between the enterprise and workgroup categories we've been using. The $12,900 list price is on the high side for the workgroup, especially considering the product's

mediocre performance in our workgroup server testing. But the feature set clarifies what Koutech means by Application Server.

The maximum 1G byte of Error Code Correction Enhanced Dynamic RAM is targeted toward database applications, and that's where this server did well. It came in second in our Windows NT database test, behind Compaq Computer Corp.'s ProLiant 800, and third in NetWare database testing. With the ability to handle a second processor and 90G bytes of internal storage, the Goliath 1100 Application Server is a serious middle-tier product.

The chassis is large enough to support extra storage. On the server's left side are the system board and expansion slots. The right side houses the easily accessible drive bays. Cables are neatly routed between the two sides. Storage is behind a locked door in the front panel.

The drives are housed in carriers that contain their own fans and can be independently locked for added security. A second locked door hides the standard drive bays and the power, reset and alarm switches. Externally, the system has LEDs for power, drive activity and several fault conditions, a plus in determining the state of the server at a glance.

The system board supports the I2O specification for high-performance I/O, but the Goliath 1100 doesn't have any I2O-compliant adapters. Instead, Koutech installed the IFT-2000 PCI RAID controller, which is based on a 33-MHz Intel 486 processor with 8M bytes of cache.

For management, Koutech turned to Intel's LANDesk software and a separate graphical management program for the RAID configuration. A LANDesk Server Manager Pro Power Control Unit is available as an option to provide dial-in capability when the server isn't responding to the network.

Documentation is complete but rather technical. Individual manuals from the OEMs are included rather than integrated documentation.

Koutech's two-year warranty is a year short of what is typical these days. Extensions are available at a higher price. A toll-free support line won't be available until the fourth quarter of the year.

Koutech
Goliath 1100 Application Server

OVERALL SCORE	6.3
Performance (40%)	7
Features and flexibility (40%)	7
Management apps/features (10%)	7
Serviceability (10%)	6

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

SERVERS: THE INSIDE STORY

	AST Research, Inc. WORKGROUP		Koutech Systems, Inc. WORKGROUP	
Model	Manhattan D6200		Goliath 1100 Application Server	
Processor	200-MHz Pentium Pro with 256K-byte Level 2 cache		Dual 200-MHz Pentium Pros with 256K-byte Level 2 cache	
Max. processors	200-MHz Pentium Pro with 512K-byte Level 2 cache		Dual 200-MHz Pentium Pros with 512K-byte Level 2 cache	
Memory	**As tested**	**Maximum**	**As tested**	**Maximum**
	64M bytes	512M bytes	64M bytes	1G byte
Slots	**Provided**	**Open**	**Provided**	**Open**
EISA	0	0	0	0
ISA	2	2	3	3
Shared	0	0	0	0
PCI	3	3	8	4
Processor	0	0	0	0
Bays	**Provided**	**Open**	**Provided**	**Open**
Internal	6	5	0	0
External	4	2	6	3
Hot-plug	0	0	7	0
Storage				
Adapter	Integrated Adaptec AIC-7880P		Infortrend IFT 2101 PCI RAID adapter with 8M bytes of cache	
Bus	Ultra-Wide SCSI-2		Ultra-Wide SCSI	
Capacity	2G bytes		17.2G bytes	
Model	IBM 32160W		Seagate Barracuda ST34371W	
Maximum drive capacity	**Internal** 24G bytes	**External** Unspecified	**Internal** 90G bytes	**External** 81G bytes
CD-ROM	Sony CDU-311 8xIDE		Toshiba 12x SCSI XM-5701TA	
Network adapter	Integrated Intel 10/100 Ethernet Pro		3Com Fast Etherlink XL	
Fault-tolerance features	Error Code Correction (ECC) RAM		ECC RAM, RAID 5, capable controller (tested at RAID 0), hot-swappable redundant power supplies, hot-swappable drives	
Security features	Padlock loop, chassis intrusion alarm, BIOS passwords, unattended start, security hot key, keyboard inactivity timer, video blanking, floppy disable, disable power and reset button, boot without keyboard and secure boot mode		Chassis front-door lock, individual hot-plug drive locks, BIOS passwords	
Bundled software	Intel LANDesk Server Manager Version 2.52, two CD-ROM training packages from CBT Systems, Windows NT Server available preinstalled on 4G-byte model		Windows NT Server 4.0, Intel LANDesk with optional LANDesk card	
Miscellaneous	Three-year, next-business-day on-site option, AST Presence Pro option preinstalls Windows NT 4.0 Server with full Internet/intranet capability		Toll-free 7x5, two-years parts and labor; extensions available, tested but not certified under NetWare, Windows 95, SCO Unix, OS/2 Warp and DOS/Windows	

Download complete server test results and more details about our test methodology.

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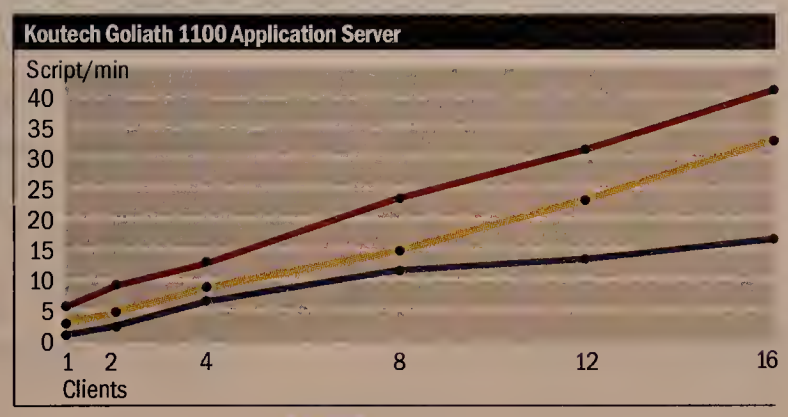
PERFORMANCE SUMMARY

We measure performance from the client's point of view and report the time it takes to complete typical tasks. Our performance summary graphs show the results of each test in scripts per minute with the number of clients ranging from one to 16. Because the tests run faster than a real client could perform the operations, each of our test clients stresses the servers as much as several real users would.



FILE SERVER Our file server tests run scripts on ascending numbers of clients for four applications: Microsoft Word and Excel for Windows, Lotus 1-2-3 for Windows and Corel WordPerfect for Windows. The scripts perform file access operations such as opening, importing and saving files.

DATABASE Our client/server database test uses Microsoft Access on the front end and Oracle Server 7.3 on the back end. We perform various read and write operations on a three-table payroll management application.

WEB SERVER Our Web server test uses Netscape Enterprise Server 2.0 under Windows NT and Novell Web Server 2.51 under NetWare. We view pages containing text and graphics, and use Open Text's Livelink Search 7.0 to search a 1G-byte document database.

Dual processors speed up the workgroup

With a price premium of $800, it's not clear whether you should add processor power to your Koutech Systems, Inc. server. But to illustrate the role of the processor in our tests, we added a second 200-MHz Intel Corp. Pentium Pro processor with 256K bytes of Level 2 cache to the configuration we tested, then reran our Windows NT tests. The surprising results can be found on Network World Fusion.

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■ **ReCor Corp.** *is shipping new* **Network Based Training (NBT) for Lotus Notes 4.5** *software.*

The offerings include NBT for Notes 4.5-Standard and Advanced, NBT for Notes 4.5-Mail and NBT for Notes 4.5-Mobile User. The courses cover new Notes 4.5 calendaring, scheduling and security features and require clients to have a VGA color monitor and at least a 66-MHz 80486 processor running Windows 3.1 or Windows 95.

A 100-user network license costs between $995 and $1,495. A site license for a minimum of 250 users is priced starting at $4,995.

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Speak up and advance your career

Use the trade show podium to gain industry visibility and open up new opportunities.

By Daniel Dern

Sometimes getting ahead in your career is just a matter of speaking up, especially when you do it in public.

"Speaking at industry events is definitely good for one's career," says Dave Koehler, director of network technology at The Netplex Group, a systems development and integration company in McLean, Va. Koehler estimates he has spoken at four shows a year for seven years. "The preparation forces you to keep current, and it gives you visibility and credibility, both within the industry and your own company."

Check out Network World Fusion for links to sites that can help you speak out.

- **Trade Show Central, a searchable database of shows devoted to just about every topic**
- **Tips from speaking coach Lenny Laskowski, such as 10 ways to handle hostile questions, and suggestions for overcoming anxiety about speaking in meetings and presentations**
- **Instructions for submitting a proposal to lead a session at a Digital Consulting conference or NetWorld+Interop**

Whether it's participating in panel discussions or giving presentations about projects at trade shows, speaking can lead to a better job or even a complete career change. Just ask Cheryl Currid, former director of IT at a division of The Coca-Cola Co. and now president of Currid & Co., a technology consulting firm in Houston.

"Speaking and writing made my career," Currid says. "I did it to share what we were doing and to learn more about what others were doing. What I learned was that speaking has many benefits, such as getting asked hard questions from the audience that you may not have gotten at your own company."

Another benefit, Currid says, is that you get some good tips. "The more I spoke and got closer to the industry, the more that industry people came to me with good ideas, because they knew I'd talk about them if I liked what I got."

There's no shortage of speaking opportunities, especially if you're willing to travel and your company is supportive.

Obvious events to target are trade shows such as Comdex, ComNet and NetWorld+Interop. Then there are technology-specific shows put on by industry groups such as the Electronic Mail Association and UniForum. Firms such as Digital Consulting, Inc. also run a series of industry or technology-specific events.

"Identify the network issues you've examined or the problems you've overcome in the past 12 months," advises Joann Anderson, a director at Copithorne & Bellows, a public relations firm in Boston that places speakers at trade shows. "These are the kind of topics show managers want discussed, so these are good ones to suggest speaking on."

Try contacting shows directly — by phone, E-mail or even through an event's Web site — to volunteer as a speaker.

However, if you're new to the speaking game, you may first want to see if your marketing or public relations department can help. People in those departments may know more about how to get you on a trade show speaker roster. They're also likely to know some of the key players at various shows and may help you put together a presentation.

If your own company isn't familiar with the network event scene, consider contacting the public relations departments of your vendors. Many vendors will help you as part of their customer relations activities, even if they don't get direct testimonial value from what you say at the podium.

You also can turn to a third party for help. "We are in daily contact with conference managers around the world and can cost-effectively pursue more opportunities," says Terry Catchpole, president of Catchpole Corp., an executive speaker placement firm in Wellesley, Mass. "Plus, conference managers frequently call us when they have openings for speakers."

Consider this opportunity to step into the limelight. It could establish you as an industry expert and open you up to new career opportunities.

Dern is an author, speaker and consultant who works with businesses and end users to develop Internet/intranet strategies. He can be reached at ddern@world.std.com.

Understand the business before you say anything at a trade show

Before you go trotting off to get yourself a speaking engagement, there are some basic concepts you should understand.

■ Plan ahead. Proposals for giving a presentation at a trade show need to be submitted up to nine months before the event. "For a large show — 40,000 attendees or more — the serious work of selecting topics and assigning speakers is completed five to eight months before the show," says Bill Laberis, president of Bill Laberis Associates, a media consulting and publishing firm in Holliston, Mass., and conference chairman of ComNet '98. "It's certainly not two or three months. There's always the chance of last-minute cancellations or changes, but don't count on that."

■ Show organizers receive dozens of submissions for sessions on popular topics. Although many topics won't be even remotely appropriate, you'll need to take extra care to make your proposal stand out as worthy of a closer look.

■ If you have spoken somewhere before, let show organizers know. While the industry always needs new blood, people who know the drill make life easier for show planners.

■ Define topics that will be of interest to the audience. "Study last year's brochure," Laberis says. "Typically, for annual events, the overall tracks and sessions are similar from one year to the next, although there's clearly change over time."

■ Follow instructions and deadlines for submitting materials such as the handouts you'll give attendees.

■ If you do get selected, by all means show up or don't expect to be invited back. Even if you need to send a substitute speaker because of a schedule conflict, let show planners know as soon as possible.

The same applies to content. Don't turn in one presentation at the proposal stage and give another one at the show. Make show planners aware of the change early enough for them to work with you. Above all, don't turn your presentation into an advertisement for your company or its products.

■ Start small and local. Speaking at a local, company-sponsored event, user group or professional association is one way to break into the business.

■ Study your competition and learn the scene. Go to other sessions led by end users and observe critically. Notice what seems to be well received by the audience. Borrow what works.

— Daniel Dern

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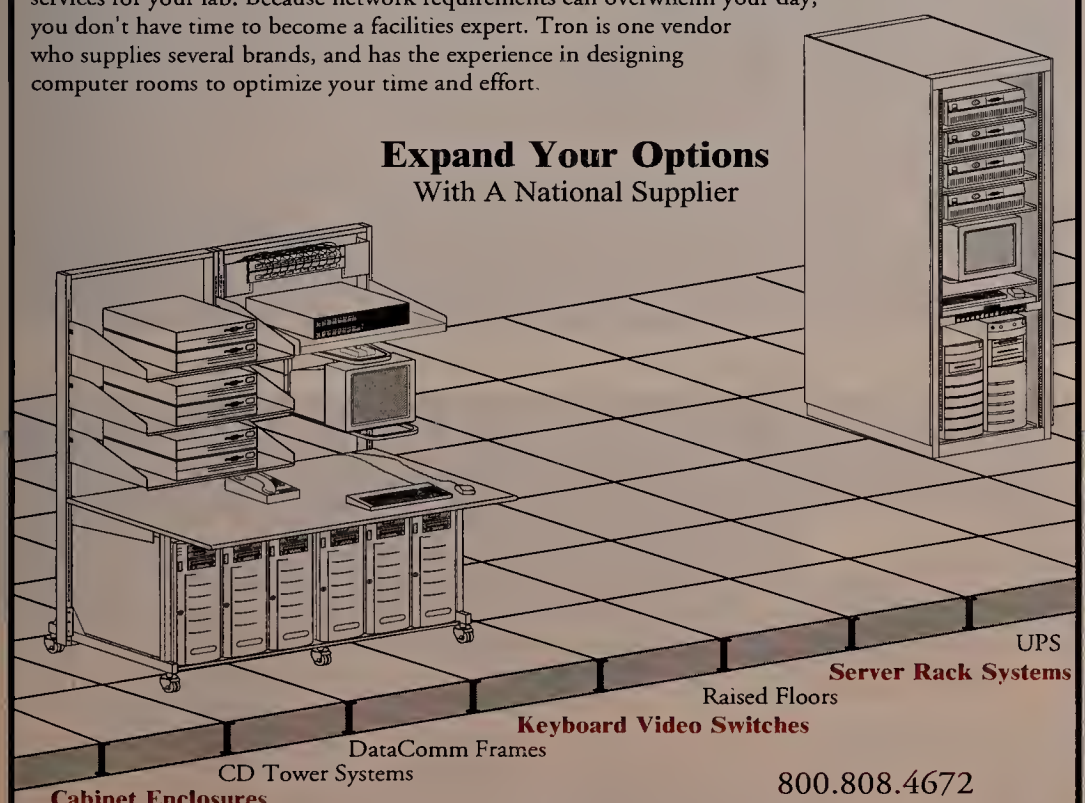

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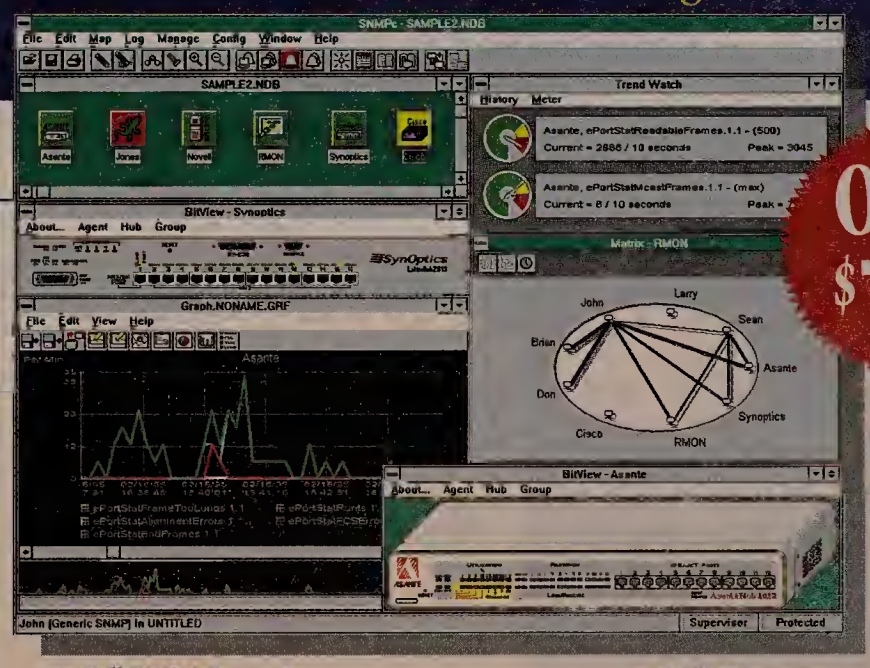

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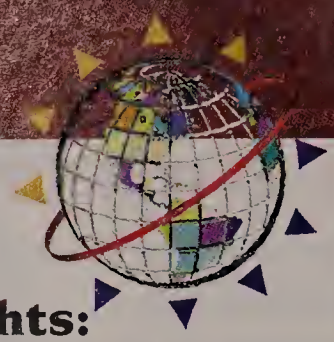

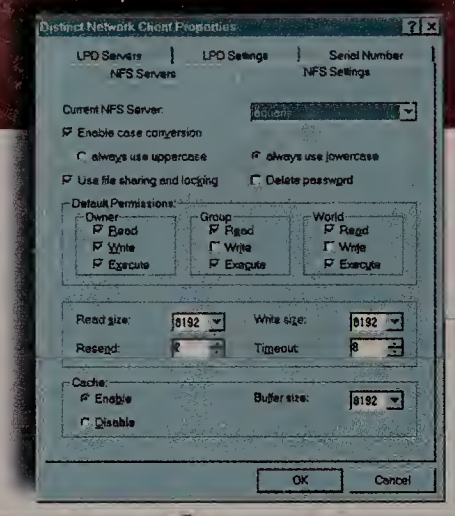

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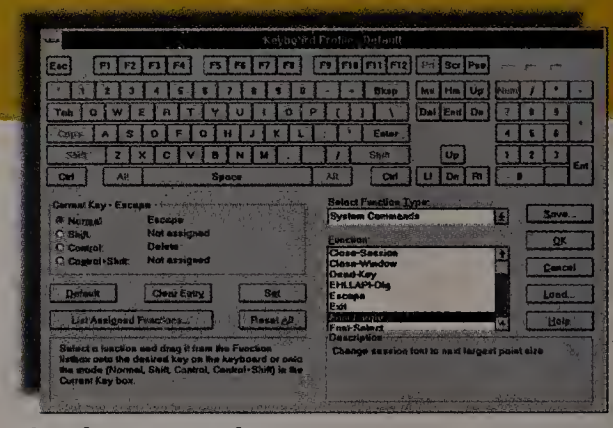

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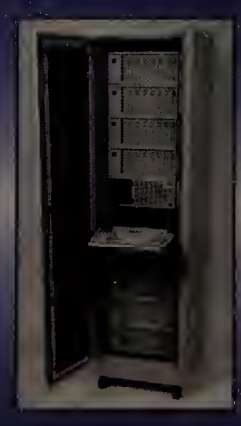

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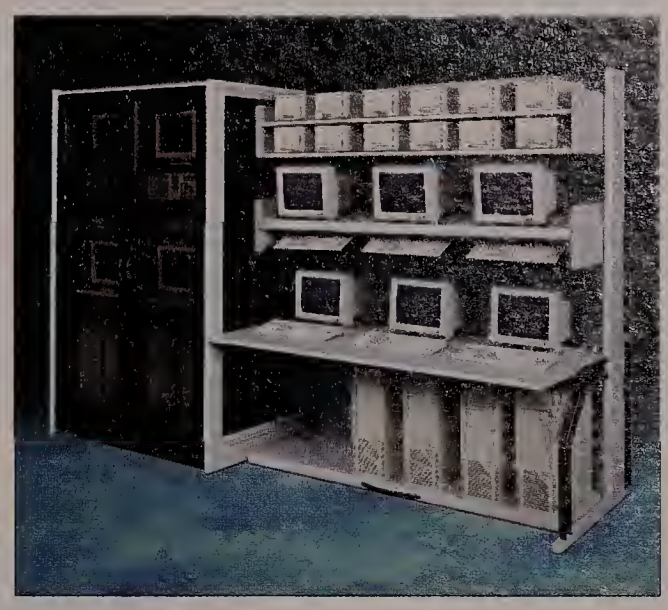

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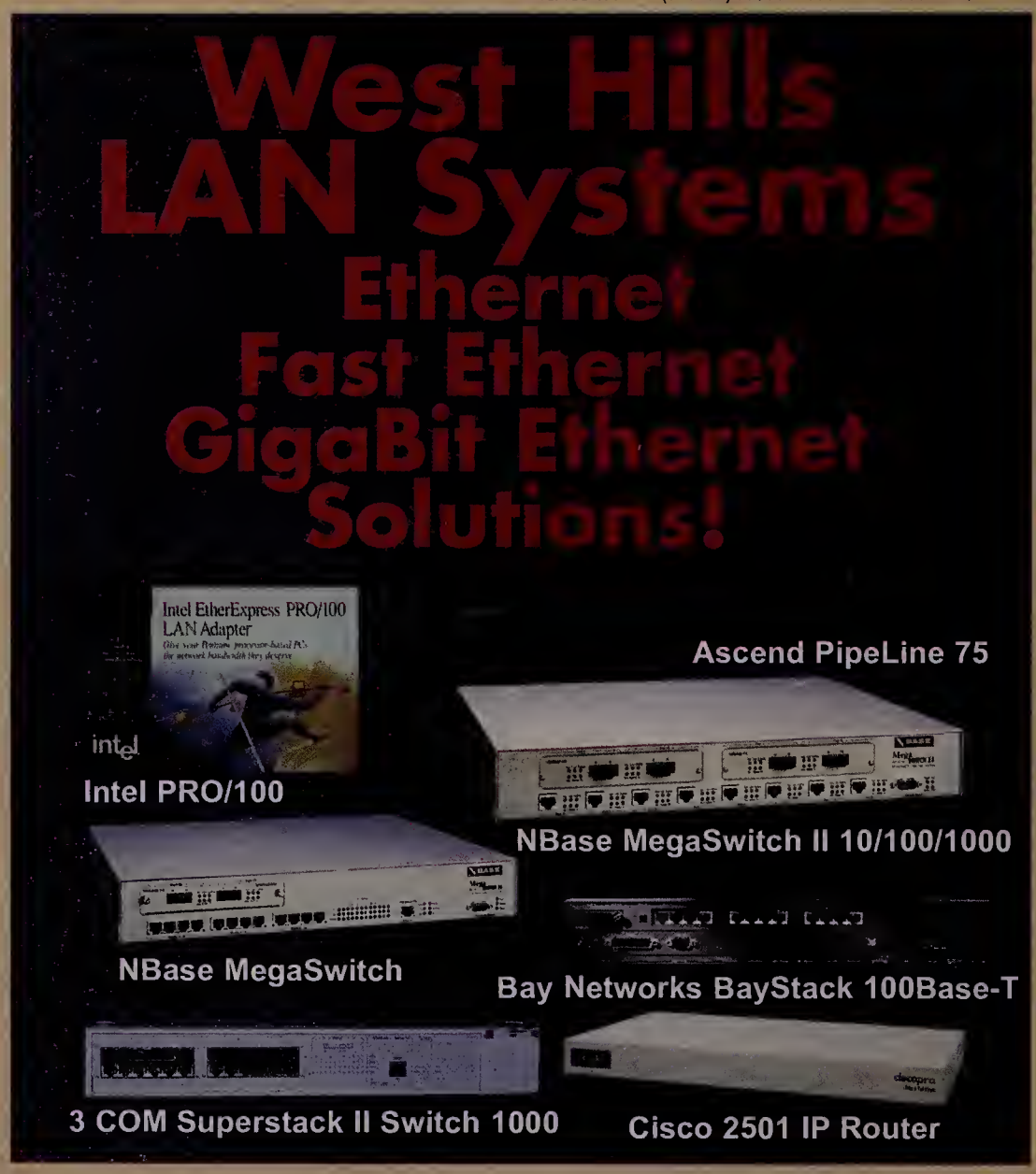

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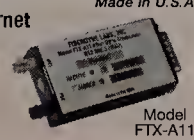

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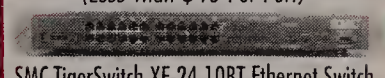

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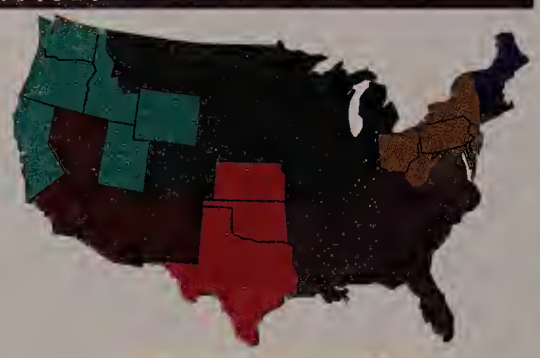

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*Indicates Regional/Demographic

T-3

Continued from page 1

sought by very large customers.

"There is an industry-wide shortage of T-3 capacity," said Steve Sobolevitch, manager of data strategic pricing for AT&T, which raised T-3 prices 15% earlier this month. ISP demand for AT&T's DS-3 and OC-3 (155M bit/sec) circuits has more than doubled in the past year, and "that is absolutely one of the reasons why we made the price increase," he said.

A year ago, buyers "could shop around for DS-3 circuits and get a deal," said David Goodtree, who heads the Telecom Strategy Service at Forrester Research, Inc. in Cambridge, Mass. "Now they're lucky if they can even get one in 45 days."

Members of AT&T's Enterprise Networking Technologies Users Group are finding that "everybody is competing" for the high-speed circuits, said Linda Tratnik, manager of network services for TRW, Inc.

The trend threatens to affect even users who do not require T-3 lines directly. Most frame relay, ATM and Internet traffic — and even dial-up voice, fax and data traffic — is carried at some point over a carrier or ISP backbone consisting of DS-3 and higher circuits. Carriers offering some or all of these services are seeing their cost of doing business increase and may have no choice but to pass the cost along.

"Once private-line rates go up, it's going to start driving switched rates up also," said John Fleming, executive vice president of Austin, Texas-based IXC Communications, Inc., a network capacity wholesaler.

The increase in network backbone costs threatens to put customers of second-tier and third-tier long-distance carriers at a disadvantage. Those carriers must supplement their facilities, which are often concentrated in one region of the country, with high-capacity circuits purchased from a national carrier.

"Most of the major carriers are not even selling to other carriers," Fleming said. "They're keeping [circuits] on their own network or selling them to their own users."

One way the biggest carriers are dealing with the problem is by eliminating the 35% to 40% volume discounts they used to give other carriers to buy up excess capacity, said Tony Rosati, a group manager for international data services at Sprint Corp.

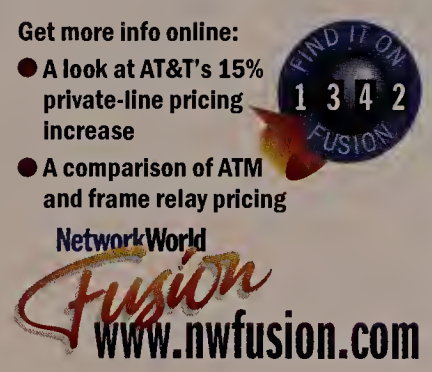
"We're looking to meet our end-user customers' requirements first," he said. "I know that when I go to MCI or AT&T, they tell me, 'Here's the list price. Pay it, or you can't have it.'"

Rosati claims that "spot outages" led Sprint to quote 90-day installation intervals last year. But he said completion of new Synchronous Optical Network (SONET) rings — now carrying nearly half of Sprint's backbone traffic — have reduced that interval considerably.

AT&T suggests alternatives for users who need more capacity quickly. "If a T-1 or multiple T-1 lines will meet their needs for a period of time, we would work with them," Sobolevitch said.

Get more info online:

- **A look at AT&T's 15% private-line pricing increase**
- **A comparison of ATM and frame relay pricing**



All this is taking place even though the telecommunications industry is said to have a glut of fiber-optic capacity. The problem, said IXC's Fleming, is that carriers have fallen behind in installing a new generation of electronic equipment that are optimized for carrying fast-packet traffic across SONET backbones. ■

FVC

Continued from page 1

on demand over Ethernet. The products will be on display at the upcoming NetWorld+Interop show in Las Vegas.

Although it is possible today to run video over Ethernet, the quality is jittery and not much better than a still photograph, according to Kathryn Korostoff, president of Sage Research, Inc., a Natick, Mass.-based market research firm.

"Every video demo I've ever seen that's based on Ethernet has been unacceptable for meeting purposes," she said. "If First Virtual can provide video that's a substitute for being there in person, then it's got a real serious competitive advantage in the marketplace."

Previously, video LAN applications that require 128K to 2M bit/sec of bandwidth were limited to pure ATM LAN environments. In fact, ATM vendors have always pitched their technology as a better multimedia option than Ethernet. So First Virtual's IP video announcement helps legitimize Ethernet for multimedia services, industry observers said.

And with more than 100 million Ethernet nodes installed worldwide, it makes sense for vendors to extend multimedia capabilities to TCP/IP-based nets, one analyst said.

"The desktop is likely to remain Ethernet for the foreseeable future, so ATM vendors like First Virtual need to devise ways to take the value-add they're providing to the cell-based world and transition it into the frame-based world," said Skip MacAskill, an analyst with Gartner Group, Inc. in Stamford, Conn.

Ralph Ungermann, president and CEO of First Virtual, agreed. He said offering an Ethernet version of his company's video products is a good business decision. "The reality of the market is that there is a huge installed base of Ethernet," he said. "These devices need to be included in the multimedia networks being developed by large corporations."

And desktop videoconferencing is more prevalent than many people think. A recent Sage Research study of 700 network professionals found that 19% of U.S. businesses already use the technology; an additional 47% plan to deploy it within two years.

Video on IP

Here's how Ethernet and ATM video quality compare.

- **Ethernet:** Used for one-way, noninteractive applications such as video training and video on demand, Ethernet/IP-based video provides quality that approaches the video quality seen on ATM networks.
- **ATM:** For two-way, interactive applications, particularly videoconferencing, ATM provides significantly higher quality than Ethernet. In addition, the quality of video is consistent across LAN and WAN ATM environments.

Note: First Virtual's Ethernet and 25M bit/sec ATM switches both cost approximately $320 per port.

Product specifics

In response to this anticipated demand, First Virtual will unveil products that provide video to Ethernet clients attached to ATM backbones. These include its Media Operating Software (MOS)-IP for QoS signaling, the V-Ether Ethernet switch module and an H.323-to-H.320 gateway.

MOS-IP is middleware that lets video applications take advantage of QoS capabilities. The software runs on Ethernet switches, servers and PC clients and uses the recently developed RTP and RSVP specifications to enable high-quality video streaming in IP environments.

Customers can use the MOS-IP software with the V-Ether Ethernet switch or any other vendors' Ethernet devices. But First Virtual's V-Ether switch module for its V-Switch ATM workgroup device is designed specifically to handle high-quality video over Ethernet, Ungermann said.

The highlight of the V-Ether module is that it can be equipped with an optional daughter card that provides every port on the V-Ether with dual traffic queues, analysts said. This allows V-Ether to simultaneously stream video through a high-priority queue and send data traffic through a lower priority queue.

First Virtual's products appeal to Ethernet switch customers. "Anything that would avoid ATM to the desktop is good news," said Chuck Beam, manager of operating systems and software at Duke Power Company in Charlotte, N.C.

Pricing for MOS-IP is $2,400 for a 10-user license, V-Ether starts at $2,000 and V-Gate323 costs $20,000.

All products will ship in the third quarter.

✆ First Virtual: (800) 351-8539.

Cisco

Continued from page 1

Even as it kicks up the speed on existing devices, Cisco is developing three models of the Gigabit Switch Router (GSR) — formerly known as the Big Fast Router — that will be "aggressively" priced against competitive offerings, sources said.

To boost the mid-range, Cisco's 4500 and 4700 will get a High Speed Serial Interface Network Processor Module (HSSI NPM) that supports data transmission speeds of up to 52M bit/sec. This represents a more than sixfold increase in performance over previous serial connections, which peaked at 8M bit/sec, Cisco said.

HSSI NPM costs $6,000 and is available now.

To relieve bottlenecks in the Internet backbone — the net core — Cisco is developing 12- and 16-slot models of the GSR, sources said. A Cisco spokesperson said there will be three models, including one with less than 12 slots, but declined to go into further detail.

The GSR is a crossbar IP switch that will deliver 5G bit/sec of bandwidth per slot, or up to 80G bit/sec on the 16-slot version, and forward in excess of 150M packet/sec, sources said.

Continental Cablevision in Boston is testing the 12-slot version and plans production cutover at year-end, said Paul Bosco, director of broadband infrastructure and services development for the cable company.

The GSR will support "several hundred thousand" routes, sources said. The GSR line cards will support high-density OC-3 and single-port OC-12 packet-over-Synchronous Optical Network (SONET) interfaces when GSR ships in the second half, sources said.

Multiple-port OC-12 line cards and single-port OC-48 modules are expected in subsequent releases, the sources said. GSR will be "very aggressively priced" against Ascend Communications Corp.'s high-end 16G bit/sec GRF, which costs about $336,000 when fully configured with two-port, multimode OC-3 SONET cards. ■

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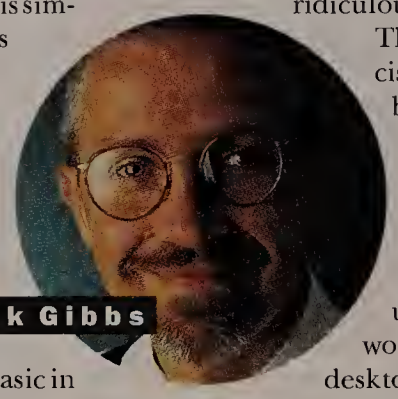
Backspin

Disney meets your desktop — Animated paper clips matter

"Who needs an animated paper clip?" was the sarcastic comment made by a cynical IT person quoted in some second-rate industry publication on the topic of Microsoft's new Office Assistant.

If you haven't checked out Microsoft's Office 97, you've missed out on a truly impressive release. The suite is simply bursting with new features (though I'm not sure I care much for the new menu style — too fussy and tricky). Some of these features are really outstanding, such as the ability to include hyperlinks in Word documents and Excel spreadsheets, and the incorporation of Visual Basic in everything.



Now, the animated paper clip serves as the interface to user help while you're using Office applications. The paper clip is a small panel that floats above the other windows and contains an animated character.

Assistant acts as a versatile warning and help system. For example, if you try to close a file without saving, Assistant will make a sound and pop up a panel shaped like a cartoon speech bubble. Inside the bubble are the same options that used to be displayed in a standard dialog window.

Assistant will most likely appeal to end users because it gives their work personality and makes the desktop just a little bit friendlier.

And if you press F1 at any time, up pops a dialog box that lets you to enter a free-form query, get tips and select options.

So far, all this amounts to is a different presentation than in previous versions of Office. However, that is not all Assistant can do. While it integrates some features of the old help system in some minor but novel ways, Assistant is also watching what you do. It can be set up to offer tips relevant to whatever you are currently doing, and it is smart enough to move out of the way when you work near it.

Much to my surprise, I like Assistant. In practice, it is useful, and on a large screen its window isn't particularly intrusive.

Assistant also has multiple personalities. The somewhat laid-back but occasionally manic paper clip with eyes (called Clippit) can be replaced with other characters, such as a puppy (not my taste at all), a robot, a kind of Claymation Einstein figure, or a ridiculous red ball.

The nub of much of the criticism about Assistant seems to be over what is perceived as its trivial nature. Yet, the reality is it lightens up an otherwise pretty complex and technical environment. Assistant will most likely appeal to end users because it gives their work personality and makes the desktop just a little bit friendlier.

I wonder, however, what Assistant really is. I would guess that today's Assistant is probably the first incarnation of a real Assistant — a process that will learn your habits and preferences and monitor your work environment.

Indeed, the first hint of the direction Assistant is heading is it's programmable. While Microsoft, as far as I can tell, hasn't made much of this, you can find an application note at www.microsoft.com/kb/articles/q161/0/14.htm and check Visual Basic help for information on the Assistant object.

I'd like to see Assistant notify me of new E-mail and low disk space, schedule applications to be run, set and announce alarms, and display selected data pushed to me from news wires and other services.

I see Assistant becoming a far more powerful system tool in short order.

So, what services and features do you think Assistant should have? Send requirements and specifications to nwcolumn@gibbs.com, or detail your needs at (800) 622-1108, Ext. 504.

Avast behind, me hearties. Cap'n Gibbs has a little unfinished business, having launched this week's broadside at the good ship networking. Some time ago, I offered T-shirts for people who could provide a reasonable etymology of various phrases or answer other challenges.

Well, I finally received said T-shirts (the delay was due to the world T-shirt shortage), and I'm ready to send them out. Trouble is, I can't find the E-mail messages with the lucky winners' addresses. So, if you were one of that select crowd, please send me a message (in full) confirming your great good fortune.

(And before any of you creative types decides to try and finagle a T-shirt under false pretenses, just note that I can verify the messages I sent.)

'Net Buzz

The latest on the Internet/intranet industry

By Chris Nerney

Today we will inflame the passions of the Internet conspiracy theorists.

We will do it subtly, first juxtaposing recent news events with selected facts and then adding open-ended questions and statements with vaguely sinister implications. This way, normal people get their news, and nuts get their paranoia fix.

It should be lots of fun.

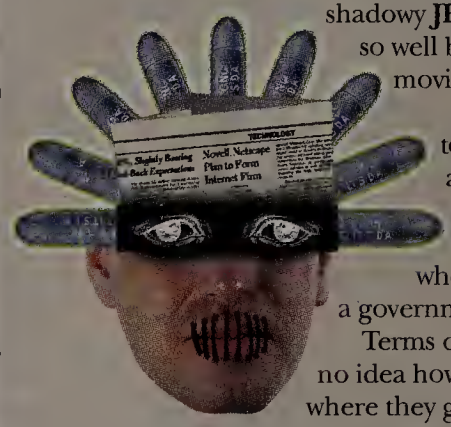
Oh, one more thing: Rather than making each piece of news a separate item, as is our norm, we will link them. After all, everything is connected, isn't it? No? You're so naive.

ONE INTERNET, ONE WORLD?

Lots of news to report on Internet security. At least, this is the news we know about.

Encryption software vendor **Pretty Good Privacy, Inc.** (PGP) announced last week it has purchased **Zoomit Corp.,** developer of a directory designed to integrate corporate intranets, extranets and the Internet.

PGP is in San Mateo, Calif., not far from some of the nation's **largest defense contractors.** Zoomit is based in Toronto. Another company once based in Canada, Permindex, had as a member of its board of directors shadowy **JFK assassination** figure **Clay Shaw,** played so well by **Tommy Lee Jones** in the **Oliver Stone** movie. Clay Shaw, needless to say, is now dead.



PGP says its goal in acquiring Zoomit is to provide encryption products for private and public networks. Encryption software allows anyone to send information electronically without risk of interception, whether sent by an individual, a company or a government.

Terms of the deal were not disclosed, so we have no idea how much PGP spent. Or, for that matter, where they got the money.

Meanwhile, **RSA, Japan,** another encryption vendor, announced it has received funds from three companies, including **Sony Corp.**

RSA, Japan is a subsidiary of **RSA Data Security, Inc.,** which is a subsidiary of cryptography vendor **Security Dynamics Technologies, Inc.**

All those subsidiaries, all these interesting connections. It's absolutely **Byzantine.** And there's **global monolith** Sony right in the middle of it all. You can't help but wonder.

Security Dynamics is based in Bedford, Mass., near several military installations, with other locations in England and Singapore, which are both island nations.

It also should be noted that Security Dynamics was founded in 1984, the title of **George Orwell's** nightmarish book about a totalitarian society. And only five years later, **Lyndon LaRouche** was imprisoned on charges of mail fraud and tax evasion.

Finally, we have recent events in **Austria,** which sounds a lot like **Australia,** yet another island nation.

A group of Austrian ISPs suspended service for two hours last Tuesday to protest a reported March 20 **police raid** on **ViP,** a small Viennese access provider. The protesting ISPs say the raid came more than a year after charges were filed because a customer of ViP allegedly had used the service to send child pornography over the 'Net.

Police are said to have **confiscated** all of the company's computers, hardware and software, even though ViP is not being charged. According to the Austrian ISP group, "The company is simply being destroyed to gain evidence for the case." (The ISP group has posted its version of the situation, which can be found — for now, at least — at www.internet.at.)

Pretty chilling stuff. This case makes us grateful we don't live in a country where authorities are eager to use the power of the state to confiscate your computer and criminally charge you because someone else posted illegal material over the Internet.

All right, maybe the nuts have a point on this one.

Got a dangerous Internet or intranet news item for 'Net Buzz? Get it to us before they get to you. We vow to protect your anonymity — unless we can save ourselves by turning you in. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.

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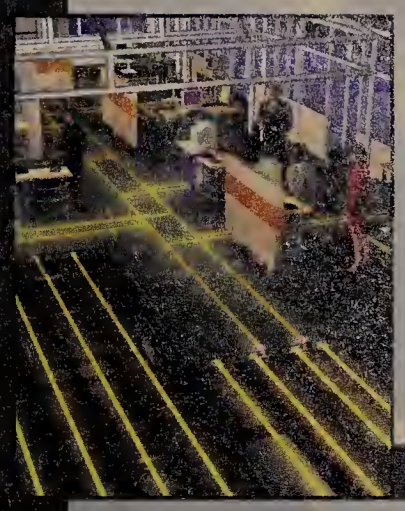

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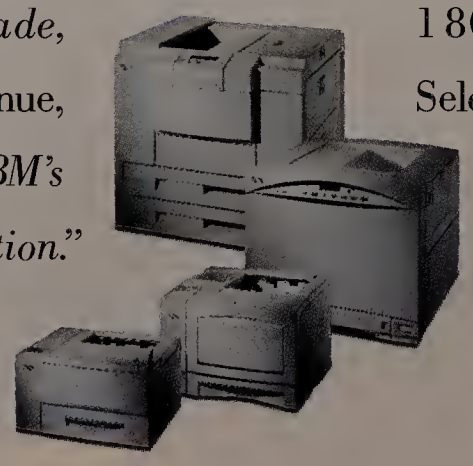

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Start-Up City gives companies that are less than two years old a chance to show off their innovative new products. These companies go on to be leaders in the industry, like Ipsilon Networks Inc., whose CTO, Tom Lyon, is a featured keynote presenter at this year's NetWorld+Interop General Conference.

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CompuServe Network Service
Computer Associates International Inc.
Computer Mail Services Inc.
Computer Publishing Group
Computer System Products Inc. (CSP)
Computer Telephony Magazine
Computone Corporation
Compuware Corporation
Concord Communications Inc.
Conduct Ltd.
Copper Mountain Networks Inc.
Corasoft Technologies Inc.
CrossComm Corporation
CRYPTOCard Inc.
CSS Laboratories Inc
CTI Magazine
Cubix Corporation
CYBERCASH Inc.
CyberGuard Corporation
CyberSafe Corporation
Cybex Computer Products Corporation
Cyclades Corporation
Cylink Corporation
D-Link
Dana Commercial Credit Corporation
Data Interface Systems Corporation
DAVICOM Semiconductor Inc.
Deyne Communications Inc.
Decisive Technology Corporation
Deltec Electronics Corporation
DeskTalk Systems
Diamond Multimedia Systems Inc.
DIGEX Incorporated
Digi International
Digicom Systems Inc.
Digital Equipment Corporation
Digital Equipment Corporation/Digital Semicon
Digital Lightwave Inc.
Digital Link Corporation
Digital Ocean Inc.
Digital: Network and Systems Integration Svcs
Digitech Industries Inc.
Dolch Computer Systems Inc.
DPT-Distributed Processing Technology
Dr Solomon's Software
DTS
e-Net Inc.
e.g. Software Inc.
Eastern Research Inc.
ECI Telecom
EDP
Efficient Networks Inc.
Eicon Technology Inc.
Elementrix Technologies
Elsner Technologies Company
EMC Corp.
Emulex Corporation
Epilogue Technology Corporation
EQUANT Network Services The Americas
Equinox
Esker Inc.
Essential Communications
EtherCom Corp
EtherWAN Systems Inc.
Everest Cabinets (A Division of Everest Elect)
Exabyte Corporation
Exide Electronics Group Inc.
Extreme Networks
FastComm Communications
FASTLAN Solutions Inc
FIBERTRON Corporate Headquarters
Fibronics International Inc.
Flash Networks Ltd.
FlowPoint
Fluke Corporation
FORE Systems Inc.
Fresh NetSoft Inc.
Freshwater Software
Frontier Software
Frontier Technologies Corporation
FTP Software Inc.
Fujitsu Business Communication Systems
Funk Software Inc.
Gadzoox Microsystems Inc.
Galileo Technology
Gandalf Systems Corporation
Ganymede Software
Garrett Communications Inc.
Gates/Arrow Distributing
General Cable Corporation
General DataComm Inc.
General Signal Networks
Geneva Software
Gigabit Ethernet Alliance
GigaLabs Inc.
Globelcast Communications Inc.
GN Nettest Inc.
Gradient Technologies Inc.
Graybar Electric Company Inc.
GTE
Hahl Software Inc.
Harris & Jeffries Inc.
Heyes Microcomputer Products Inc.
Hergo Ergonomic Supp Sys/Hertz Tech Group
Hewlett-Packard Company
Hippi Networking Forum
HITACHI Internetworking
HT Communications
Hubbell Premise Wiring Inc.
Hughes Network Systems
Hummingbird Communications Ltd.
Hypercom Network Systems
Hyundai
i-Cube
IBM Corporation
IDG
IEEE Communications Society
IgT - Integrated Telecom
ImageNet Ltd.
IMC Networks
IML Inc.
Infinite Technologies
Ingram Micro
Integrated Circuit Systems
Integrated Network Corp.
Integrix Inc.
Intel
Intelligent Computer Solutions
Intergraph Computer Systems
InterMetro Industries
Interphase Corporation
INTRAK INC.
Ipsilon Networks Inc.
ISDNet
ISDTRD Network Management Inc.
Iterated Systems
IXC Communications Inc.
JAYCOR
JCH Wire & Cable
JMR Electronics Inc.
JONES FUTUREX Inc.
JVC
Jyra Research Inc.
K-NET Ltd.
Kaspia Systems
Kawasunee Scientific
KeyLabs Inc.
Kingston Technology Company
KRONE Inc.
KTI Networks Inc.
LAN-hopper Systems Inc
LANart Corporation
LANCAST
LanOptics
Lantronix
Larscom Incorporated
LDDS WorldCom
LeaMeh DataCom
Legato Systems Inc.
Leviton Telcom
Lexmark International Inc.
Liebert Corporation
Lightwave Magazine
Linksys
Litton-FiberCom
Livingston Enterprises Inc.
Loop Telecommunication International
Loran International Technologies
Los Angeles Computer
LSI Logic Corporation
Lucent Technologies
M-Tech (Canada)
Macmillan Computer Publishing
Madge Networks
Markham Computer Corporation
Matrox Electronic Systems Ltd.
McAfee Associates Inc.
McDATA Corporation
McGraw-Hill
MCI
MCP Magazine
Mecklermedia
Media Directions Interactive
MediaTrix
Memotec Communications Inc.
Meridian Data Inc.
Mensal Inc.
MetaInfo
MFS Communications
MGE UPS Systems
MICOM Communications Corporation
Micro House International
MicroAge Inc.
Microcom Inc.
Microdyne
Micronetix Corp.
Microplex Systems Ltd.
Microsoft
Microtest Inc.
MIL 3 Inc.
Milkyway Networks Inc.
Miller Freeman Inc
Miros Inc.
Mitel Corporation
Mitsubishi Chemical America
MOD-TAP
Mohawk/CDT
Molloy Group
Motorola
Multi-Tech Systems Inc.
Multipoint Networks
Mylex Corporation
National Registry Inc.
NBase Communications
NDC Communications
NEC
Net Wizard Ltd.
Net2Net Corporation
NetAccess—A Xircom Company
Netcom Systems Inc.
NetEdge Systems Inc.
Netegrity
NetFRAME Systems Inc.
NetICs
NetLOCK
NetManage Inc.
NetSpeed
NetSuite
NETSYS Technologies Inc.
Netware Users International
Netwiz
Network Analysis Center Inc.
Network Appliance Inc.
Network Communications
Network Computing
Network General Corporation
Network Hardware Resale Inc.
Network Instruments LLC
Network Integrity Inc.
Network Intelligence Inc.
Network Peripherals Inc.
Network Systems
Network TeleSystems Inc.
Network Tools
Newbridge Networks
Newton Instrument Co. Inc.
Nichols Research
Nitech Inc.
NORDX/CDT
Nortel - Northern Telecom
Notification Technologies Inc.
Novell Developer Services
Novell Yes Partner Pavilion
Noyes Fiber Systems
Nuera Communications
Objective Systems Integrators
Objectivity Inc.
Odetics Telecom
Olicom USA Inc.
Omtool
ON Technology Corporation
OnStream Networks Inc.
OpenConnect Systems Inc.
Optical Cable Corporation
Optical Data Systems Inc. (ODS)
Optimal Networks
Orckit Communications Inc.
Ordinox Networks
Ortronics Inc.
Osicom Technologies
Overland Data
Pacific Bell
Pacific Coast Cabling Inc.
Packet Engines Inc.
PairGain Technologies
Panamax
Pandait Corporation
Paradyne
Paragon Networks International
PartnerNet
Patton Electronics Company
Peek Technologies
Penril Datability Networks
Peregrine Systems Inc.
Performance Technologies Inc.
Persoft Inc.
phoNet Communication Ltd.
Pilot Network Services Inc.
Pivotal Networking Inc.
Plaintree Systems Inc.
Plexcom Inc.
Polaris Communications Inc.
Positron Fiber Systems Inc.
Powercom America Inc.
PowerTerm
Precept Software
Prentice Hall PTR
Process Software Corporation
Procom Technology
Prominet Corporation
Profeon
Proxim Inc.
Pulsecom
Quadritek Systems Inc.
QUALCOMM Inc.
Quantum Corporation
Racal-Datacom
Racon Inc.
RAD Data Communications
RAD Network Devices Inc. (RND)
RADCOM
Rapid City Communications
Raptor Systems
Raritan Computer Inc. (RCI)
Raytheon
Rdc Networks
RedCreek Communications
Remedy Corporation
Resonate
RightFAX Inc.
Rose Electronics
RSA Data Security Inc.
Sahara Networks Inc.
SALIX Technologies Inc.
Samsung Telecommunications America Inc.
SanRex Corporation
SAS Institute Inc.
Sassafras Software Inc.
Satel Communications
SCO
SCO World Magazine
Scope Communications Inc.
SDL Communications Inc.
Sea Change Corporation
Seagate Software
Seattle Software Labs Inc.
Secure Computing Corporation
Security Dynamics
Sentient Networks Inc.
Sentry Publishing Company
Sequel Technology
Server Technology Inc.
Shasqn Industries Inc.
Shiva Corporation
Shomiti Systems
Siecor Corporation and Corning Inc.
Siemens EC Inc. Fiber Optics Division
SilCom Technology Inc.
Silicon Systems
SIMPLESOFT Inc.
Simware Inc.
SMARTS
SMC
SNMP Research International Inc.
SNT (Switched Network Technologies)
Software Artistry Inc.
Software Support Inc.
SolCom Systems
Sonic Systems
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StarBurst Communications Corporation
StarRidge Networks Inc.
StarTech Computer Products
Stellcom Technologies
Storage Dimensions
Strategic Network Consulting
Sun Microsystems Inc.
Support Net Inc.
Symantec Corporation
Symbios Logic Inc. - MetaStor Solutions
Sync Research
Syndesis Ltd.
SysDraw Software Company
SysKonnect Inc.
Systems Manufacturing Corporation (SMC)
TAC Systems Inc.
Techion Network Technologies
Tally Systems Corporation
Tally Systems Group
Tatung Science & Technology Inc.
TDK Systems
Tech Data Corporation
Technical Communications Corp.
Technically Elite Inc.
Tekelec
Tektronix Inc.
Telco Research
Telebit Corporation
Telecommunications® Magazine
Telenetworks
Telephony Magazine
Teleport Communications Group
TeleProcessing Products
Texas Instruments Inc.
TFL
The Applied Technologies Group (ATG)
The Network Buyer's Guide
The Siemon Company
Thomson-CSF Enterprises Networks
Tinwald Networking Technologies Inc.
Tivoli Systems
TLSI
Tom Sawyer Software Corporation
Toshiba America Electronic Components
Trancell Systems Inc.
Transarc Corporation
Transition Networks Inc.
Transitional Technology Inc.
TranSwitch Corporation
Tricord Systems
Tripp Lite
Triticom
TrueTime Inc.
Trusted Information Systems Inc.
TSI Telesys
TSP Companies Inc.
TTC (Telecommunications Techniques Corporation)
TTI Wireless
TxPort A Deneher Company
U.S. Robotics
UB Networks
UMI Company
UNICOM Electric Inc.
UniSPAN
UUNET Technologies
V-One Corporation
Verilink Corporation
ViaGrafix
Vienna Systems Corporation
Vinca Corporation
Visual Networks Inc.
Voysys
VPNet Inc.
Wandel & Goltermann
WaveAccess Inc.
Westell Inc.
Western Telematic Inc.
White Pine Software Inc.
Whitetree Inc.
Wilson WindowWare
WilTel
Wisecom Inc.
Wright Line Inc.
WRD Inc.
Xaqti Corporation
XcelleNet Inc.
Xerox Corporation
XLNT Designs Inc.
Xylan Corporation
Xyplex Networks
Zaro PFT
Ziff-Davis Publishing
ZyXEL Communications Inc.

Current as of 2/19/97

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IMPORTANT: You must complete all questions to receive your FREE pass.

1) Please indicate the category closest to your company/organization's primary business. (check one)
❑ A. Aerospace
❑ B. Communications Carriers (Telco, Broadband, Internet)
❑ C. Financial Services: Banking, Insurance
❑ D. Healthcare
❑ E. Manufacturing: Computers/Software
❑ F. Manufacturing: Non-computer
❑ G. Government/Military
❑ H. Publishing/Media/Advertising/Public Relations
❑ I. Transportation/Utilities
❑ J. Wholesale/Retail: Non-computer
❑ K. Education
❑ L. Entertainment
❑ M. Computer Reseller/Retailer/VAR
❑ N. Systems Integration/Consulting
❑ O. Other
NOTE: If you checked M or N, please answer questions 3-6 as if you were employed by your most frequent or typical customer.

2) Please indicate your level of job responsibility. (check one)
❑ A. Executive ❑ B. Manager ❑ C. Staff

3) Please indicate the category that best reflects your primary job function. (check one)
Computer Systems/Operations/Networking
❑ A. IS/MIS/Data Processing
❑ B. LAN/Network Systems
❑ C. Internet/Web
❑ D. Intranet
❑ E. Data Communications/Telecommunications
❑ F. PC/Microcomputer
❑ G. Systems Analyst/Applications Development
❑ H. Systems Engineer/Integration
❑ I. Other Computer Related
(cont'd)

Administration/General Management/Departmental
❑ J. Executive/Corporate Office
❑ K. Financial/Accounting
❑ L. Engineering/R&D
❑ M. Sales/Marketing
❑ N. Other Departmental
Professional/Other
❑ O. Consulting (Computer Related)
❑ P. Training/Education
❑ Q. Other Professionals

4) I specify, recommend, approve, purchase or influence the purchase of the following computer products or services: (check all that apply)
Local Area Networks
❑ A. Network Interface Cards
❑ B. Hubs
❑ C. Switches
❑ D. Network OS
❑ E. Groupware/Email
Servers
❑ F. File/Print Servers
❑ G. Application/Database Servers
❑ H. Communication/Fax/Terminal Servers
Internetworking
❑ I. Bridges/Routers/Gateways
❑ J. Remote Access Products
❑ K. ATM/Frame Relay Switches
Network Management
❑ L. Network Management Systems/Software
❑ M. Network Security
❑ N. Network Monitors/Analyzers/Network Test Equipment
❑ O. Virus Protection Software
(cont'd)

WEB Products
❑ P. WEB Browsers/Search Tools/Engines
❑ Q. WEB Servers
❑ R. WEB Server Management
❑ S. HTML Authoring Tools/Other Development Tools
❑ T. Audio/Video/Multimedia Enabling Tools
❑ U. WEB Publishing Tools
❑ V. Firewall/Security/Encryption Software
❑ W. Transaction Processing

5) Please check the statements below that describe your involvement with networks. (check all that apply)
❑ A. I manage networks
❑ B. I design networks
❑ C. I install networks
❑ D. I troubleshoot/fix networks
❑ E. I train or support network users
❑ F. I develop applications for networks

6) Please check the statements below that describe your involvement with the Internet/intranets. (check all that apply)
❑ A. I am involved with planning/developing Internet sites
❑ B. I am involved with planning/developing intranet
❑ C. I identify opportunities or set objectives for my company's Internet/intranet efforts
❑ D. I structure/create content for the Internet/intranet
❑ E. I design graphics for the Internet/intranet
❑ F. I program in development languages for the Internet/intranet

7) How many employees work in your company: (check one)
❑ A. 50,000 or more ❑ E. 100–499
❑ B. 10,000–49,999 ❑ F. 25–99
❑ C. 1,000–9,999 ❑ G. 1–24
❑ O. 500–999

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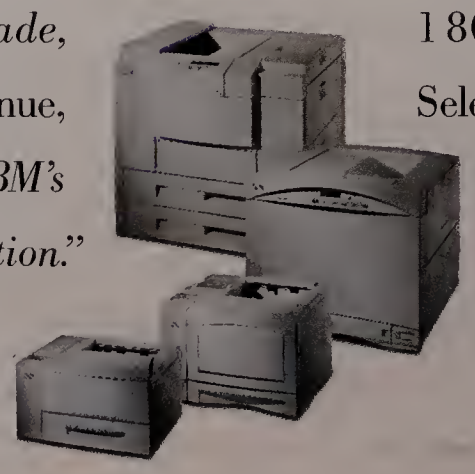

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